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PIT AND QUARRY

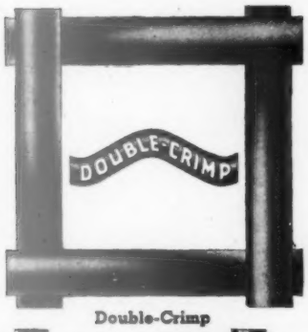
MAY, 1944

JUN 5 1944

Seventh Annual Lime and Agricultural Limestone Number

FOR 27 YEARS THE LARGEST PRODUCER CIRCULATION IN THE FIELD

JUN -5 1944



Double-Crimp

"The Perfect"

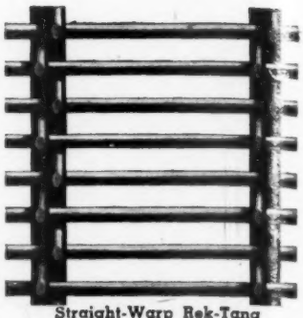
Wire Cloths and Screens

of

SUPER-LOY
STEEL
GALVANIZED STEEL
STAINLESS STEEL
NICKEL-CHROME STEEL
PHOSPHOR BRONZE
BRASS
COPPER
MONEL
NICKEL
ALUMINUM

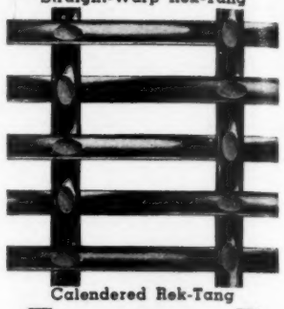
•

Any Special Metal for Any Service



Straight-Warp Rek-Tang

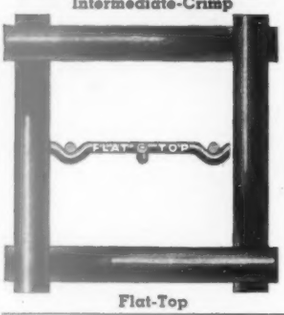
Arch-Crimp



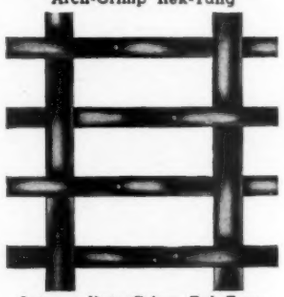
Calendered Rek-Tang

Intermediate-Crimp

Arch-Crimp Rek-Tang



Flat-Top



Intermediate-Crimp Rek-Tang

"Perfect" WEAVES

Arch-Crimp
Arch-Crimp Coiled
Double-Crimp
Double-Crimp Double-Fill Dutch
Flat-Top
Intermediate-Crimp
Rek-Tang
Rek-Tang Selvage-Edge
Straight-Warp
Straight-Warp Stranded
Sta-Tru
Triple-Warp
Twilled
Twisted-Fill
Twisted-Warp

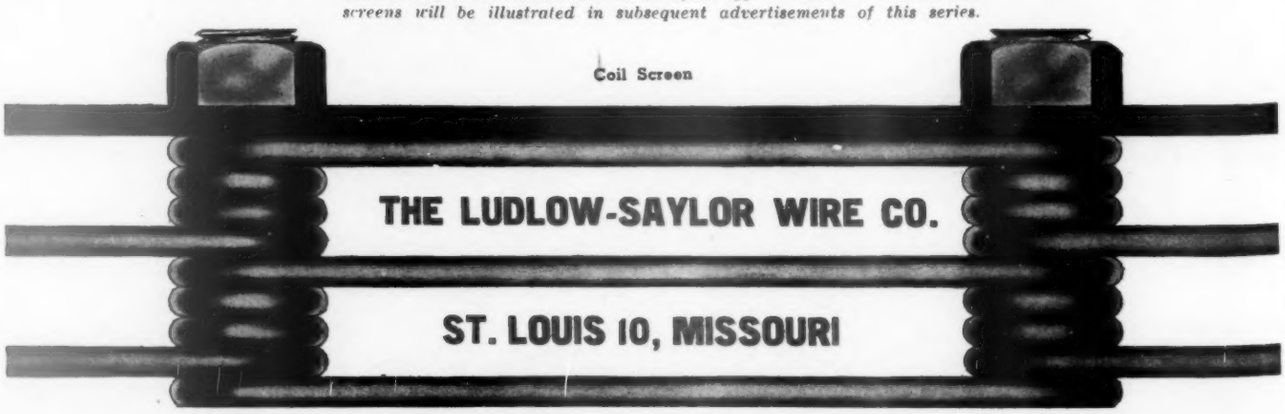
"Perfect" PROCESSING

Arc-Welding
Bending
Binding
Brazing
Calendering
Coiling
Crimping
Cutting
Dipping
Dishing
Finishing
Flanging
Flattening
Forming
Framing
Galvanizing
Jointing
Knuckling
Painting
Rolling
Selvaging
Shaping
Shearing
Slitting
Soldering
Spot-Welding
Squaring
Stitching
Tack Welding
Trimming

"Perfect" PRODUCTS

Baskets
Circles
Coils
Cones
Cylinders
Discs
Forms
Leaves
Lengths
Panels
Pieces
Ribbons
Rings
Rolls
Sections
Segments
Strips
Templates

Illustrations show items listed in bold-face type. Other wire cloths and screens will be illustrated in subsequent advertisements of this series.



Coil Screen

THE LUDLOW-SAYLOR WIRE CO.

ST. LOUIS 10, MISSOURI

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Loading limestone in an EASTON patented model TR-10 (Trackless Mine Car).

213,800 MAN-HOURS without *Accident!*

MODERN methods and equipment are essential to every safety program. EASTON semi-trailers and equipment play a big part in the accident free production of limestone at this quarry.

EASTON engineers are quarry-haulage specialists. Write to: Engineering Counsel, Easton Car & Construction Company, Easton, Pa.

EASTON

INDUSTRIAL CARS
TRUCK BODIES · TRAILERS
ELECTRIC LIFT TRUCKS

B-1011

PIT AND QUARRY, May, 1944, Vol. 36, No. 10. Published monthly by the Complete Service Publishing Company, 538 South Clark Street, Chicago 5, Ill. Subscription price $2 for 1 year in the U. S. and possessions, Canada, Central and South America; elsewhere $1 additional for each year. Single copies 50 cents. Entered as second-class matter February 28, 1932, at the Post Office at Chicago, Ill., under the Act of March 3, 1897.

In These Installations and Hundreds More

* GATES *Synthetic Rubber* V-Belts

—Are Outwearing Any NATURAL RUBBER Belts Ever Used!

MORE than 6 years ago Gates began supplying American industry with large quantities of V-Belts made entirely of SYNTHETIC rubber.

***There are, of course, many kinds of synthetic rubber. Gates uses each kind where it best meets some particular service need.**

For example:—one special synthetic rubber selected by Gates withstands oil and heat much better than natural rubber. Where oil and heat conditions are especially severe, Gates special synthetic V-Belts are giving 3 times to 4 times the service life of any natural rubber V-Belt ever used.

The fact that Gates has had such long experience in making V-Belts of synthetic rubber—and that Gates synthetic rubber V-Belts have proved themselves through more than 6 years under the severest service conditions—is of greatest importance to anyone who buys V-Belts today. The advantage of Gates' long head-start and outstanding success in making V-Belts of synthetic rubber can now be put to work for you right in your own plant.

You have only to pick up your telephone directory and call the Gates Field Engineer. He will put at your service the full benefits of Gates' knowledge and experience without the slightest obligation.

445

THE GATES RUBBER COMPANY

Engineering Offices and Stocks in All Large Industrial Centers

GATES VULCO ROPE DRIVES

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LOS ANGELES, CAL. 2240 East Washington Boulevard
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DALLAS, TEXAS 2213 Griffin Street
SAN FRANCISCO, CAL. 1090 Bryant Street

MAN, WE'RE SURE KNOCKING THE DAYLIGHTS OUT OF THAT JOB!

That's what YOU'LL say, too—if you've got Lorains working the job! They've got more power than you'll ever have use for. Their rugged, all-welded booms are brutes for punishment while the famous Center Drive design helps any operator dig faster through direct-to-the-point power transmission.

Yes sir, if a rough and tough rock shovel fits into your postwar plans, then don't forget Lorains. You can get the complete facts on Lorains by contacting your nearest Lorain distributor. Or, if you prefer, write us for our free descriptive catalog Now. The best insurance for tomorrow is the plans made today.

THE THEW SHOVEL COMPANY • Lorain, Ohio

Reg. Trade Mark

thew-Lorain SHOVELS

CRANES • DRAGLINES • MOTO-CRANES

3,200 HOURS!

From One VELVETOUCH Master Clutch Facing

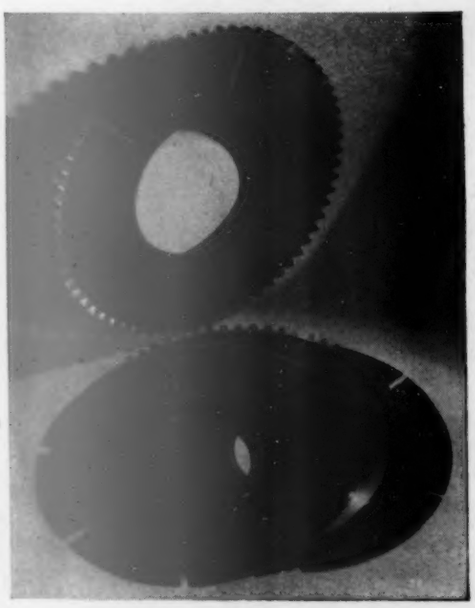
Excavating Contractor Reports Complete Satisfaction With Velvetouch in D-4 Caterpillar

Two and one-half years of dependable, smooth performance . . . and still good for many additional trouble-free operating hours! That's the story of the Velvetouch facing installed in the master clutch of a D-4 Caterpillar tractor, owned and operated by Gerl Bros. Excavating Company of Euclid, Ohio.

Andrew Gerl, Jr., head of the firm, sums up his opinion of Velvetouch in one sentence: "We are now using Velvetouch facings exclusively in all of our earth-moving equipment."

VELVETOUCH IS ALL METAL... made entirely from compressed powdered metals, welded to steel backing plates. And because Velvetouch is all metal, it wears longer . . . requires less adjustment . . . is little affected by oil or water.

Below: These Velvetouch Bimetallic clutch facings are the type used in the master clutch of the D-4 Caterpillar tractor.



Equipped with a Trackson Traxcavator, this D-4 Caterpillar, owned and operated by Gerl Bros. Excavating Company, really digs into this pile of frozen earth . . . a punishing test for its Velvetouch clutch facing.

For complete details write to:

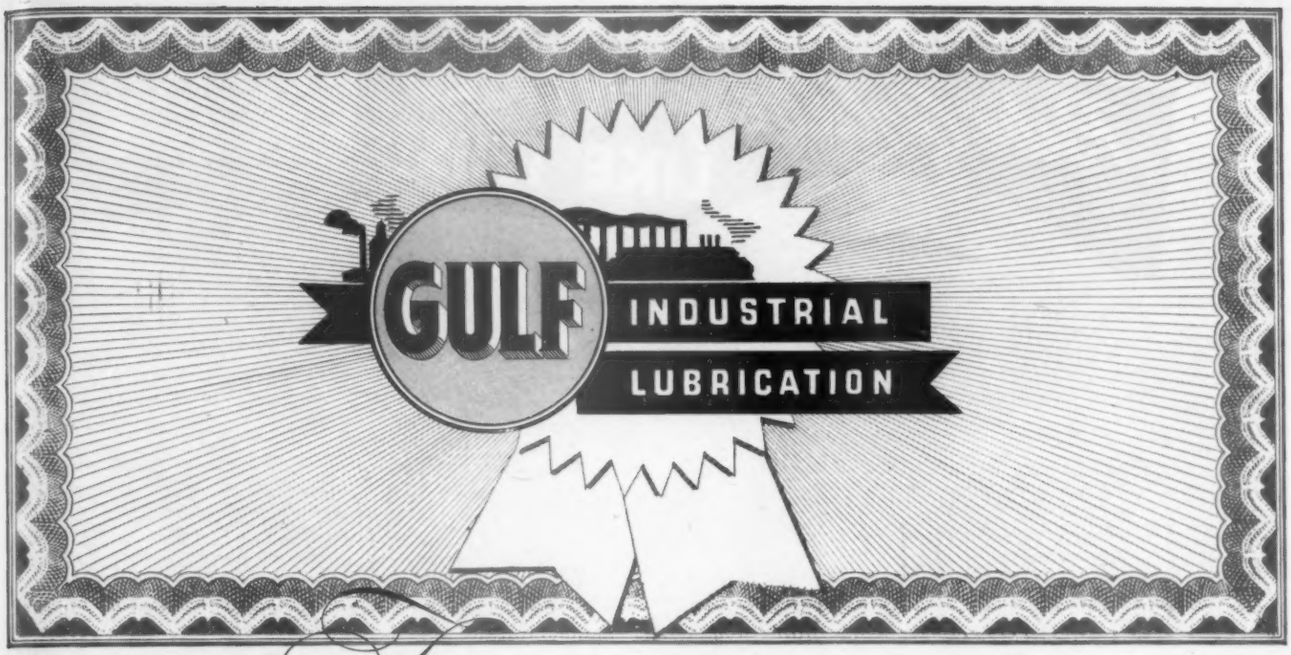
THE S. K. WELLMAN CO.

1374 EAST 51st ST. • CLEVELAND 3, OHIO

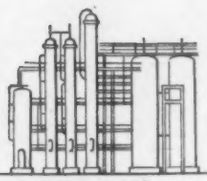
FOR BRAKE AND CLUTCH

USE Velvetouch

BIMETALLIC FRICTION MATERIAL—TRADE MARK REGISTERED

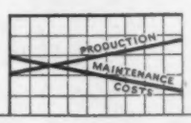


This emblem stands for:



Quality industrial petroleum products

Trained and experienced Service Engineers



Effective help on many plant problems

IN EVERY INDUSTRY, Gulf has studied the manufacturing processes and equipment and has developed the proper petroleum product for each specific requirement.

Trained and experienced service engineers from Gulf's large staff know just how these products should be applied—and with a thorough knowledge of related mechanical and operating problems, they are rendering effective aid to thousands of industrial plants, mines, quarries, and construction projects.

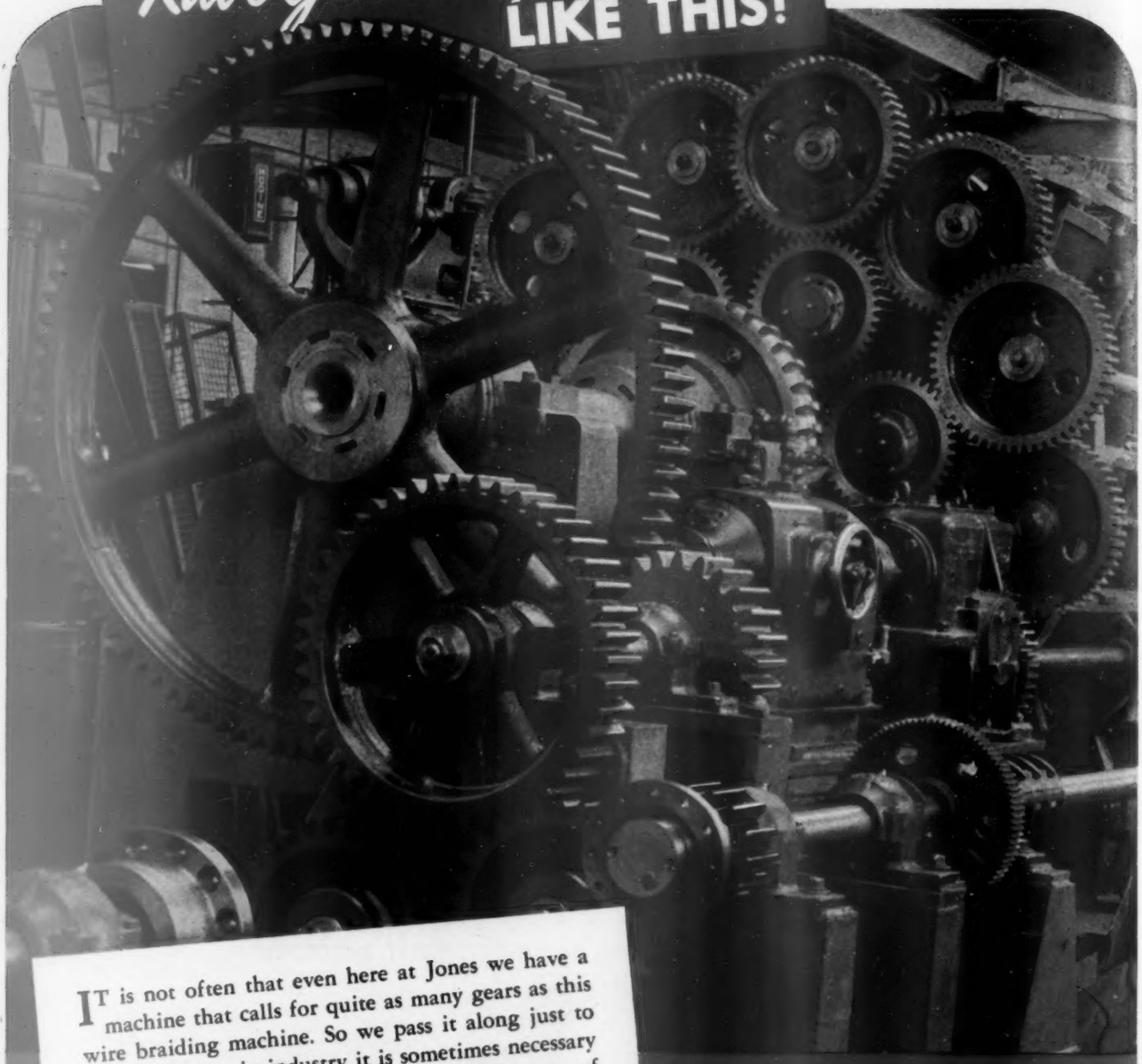
Increased production, longer bearing and tool life, improved quenching practice, better finishes on machined parts, improved rust prevention, lower maintenance costs—these are some of the results industry is obtaining by adopting the practical recommendations and suggestions of Gulf Service Engineers.

If *you* have a problem that in any way involves the use of a petroleum product, Gulf Industrial Lubrication offers *real help*. Let us hear from you.

GULF OIL CORPORATION · GULF REFINING COMPANY

GULF BUILDING, PITTSBURGH 30, PA.

Rube Goldberg WOULD LIKE THIS!



IT is not often that even here at Jones we have a machine that calls for quite as many gears as this wire braiding machine. So we pass it along just to show that even in industry it is sometimes necessary to fall back on the famous Rube Goldberg type of mechanism to handle some specific operation.

But the cut spur gears and speed reducers on this machine are typical of the thousands that are being turned out for all types of wartime applications. And the other gears in the Jones line whether Herringbone, Worm, Bevel or Mitre are playing their part on land, sea and in the air. These gears and also pinions are produced in high test cast iron, steel, bronze or non-metallic material.

W. A. JONES FOUNDRY & MACHINE CO.
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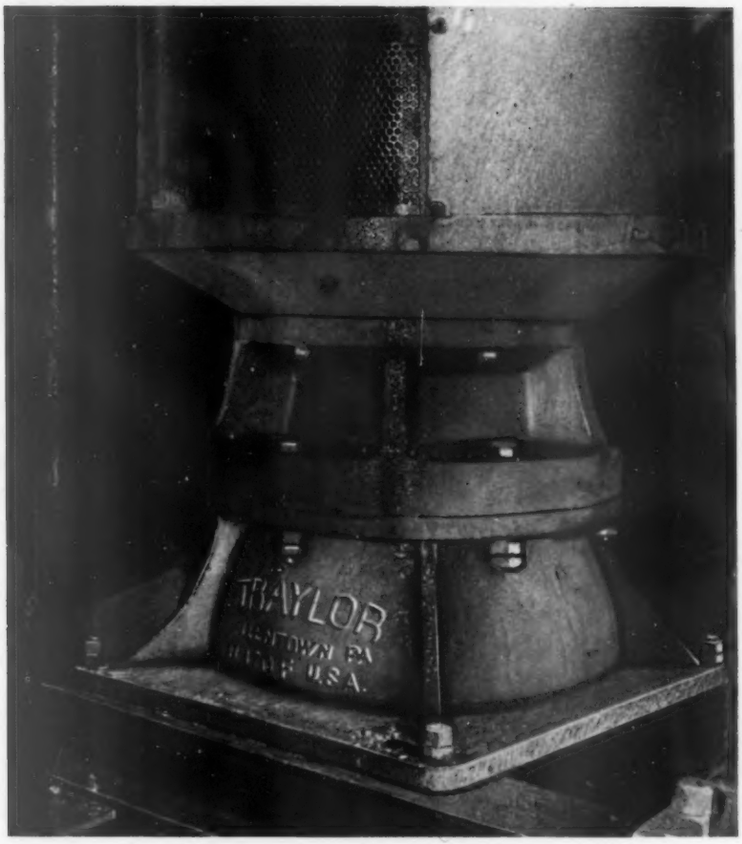
CUT AND MOLDED TOOTH GEARS • V-BELT SHEAVES
ANTI-FRICTION PILLOW BLOCKS • PULLEYS
FRICTION CLUTCHES • TRANSMISSION APPLIANCES

Catalog No. 71 contains 224 pages of engineering and application information on Jones gears. A copy will be mailed without charge and without obligating you in any way.

TRAYLOR

Type TY

REDUCTION CRUSHER



WE BUILD

Rotary Kilns
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Rotary Dryers
Rotary Slakers
Scrubbers
Evaporators
Jaw Crushers
Gyratory Crushers
Reduction Crushers
Crushing Rolls
Grinding Mills
Ball Mills
Rod Mills
Tube Mills
Pug Mills
Wash Mills
Feeders
Rotary Screens
Elevators

The Traylor Type TY Reduction Crusher embodies the four characteristics that hard-headed operators demand—(1) it delivers the exact kind of product required, of the right size, and in satisfying capacity; (2) it has strength enough, and to spare, to stand up under its job (built of steel throughout); (3) it extracts the ultimate value from wearing metal (the patented Bell Head and Curved Concaves assure this), it is inexpensive to maintain otherwise (automatic force-feed lubrication), and it is economical in the use of power (cut gearing and roller bearings); (4) it is foolproof (taken care of by protection against dust and tramp metal). The TY pictured above is doing a great job at a big mid-western gravel plant—has been on the job for over seven years, in fact, without fuss, needing few repairs except the normal replacement of wearing parts that have more than earned their cost in the production of exceptionally large tonnages. This installation is typical of many hundreds of Traylor Type TY Reduction Crushers being used in stone plants, gravel plants, cement plants, chemical plants and mining — in the United States, Canada, Central and South America, Europe, Asia and Australia. Many of these crushers are re-orders—the best O. K. there is! What the TY has done for these users, it can do for you. We can sell to you, if you are able to supply the priority. Write us—today!

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HERE'S WHY WE SAY: Allis-Chalmers are Unbiased...

CRUSHERS	Jaw Crushers	Superior Type All-Steel Blake Type "B" Blake All-Steel Fine Reduction Dodge
	Gyratory Crushers	Superior Type Type "R" Reduction Newhouse
	Roll Crushers	Double Crushing Rolls Fairmount Single Roll
	Hammer Crushers	Pulverators (Impact Type)
WASHING & DISINTE-GRATING	Screens	Revolving—Heavy Duty Rotary Scrubber Wet Vibrating Screens with or without Scrubber Pockets
	Blade Mills	Up to 12" Feed
	Revolving Scrubbers	Up to 6" Feed
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	Screw Washers	Up to ½" Feed
	Slug Mills	Grind Out Soft Materials
HYDRO-METAL-LURGICAL EQUIPMENT	Concentration	Classifiers Jigs Filters Agitators
	Cyanidation	Distributors Tanks Classifiers Agitators Filters

ALLIS-CHALMERS

of Basic Processing Equipment — Recommends

Recommendations

A GLANCE AT THE "BREAKDOWN" below gives you a rough idea of the broad range of equipment A-C builds for crushing, cement and mining industries. This "breakdown" is not complete, for A-C builds over 1600 *different* products — many of them widely used in these industries.

The significant fact is that A-C builds *all types* of basic processing equipment . . . many different styles and sizes. When you need a crusher, for example, selection can be made—not from one—but *four different* types. This means you get the *exact* equipment for your application. Yes, A-C recommendations *are* unbiased . . . because they're based on the job to be done—not an improvised way of doing it!

Next time *you* have a processing problem call on A-C. ALLIS-CHALMERS, MILWAUKEE 1, WIS.

A 1739-A

GRINDERS	Single-Stage	Rod Mills Ball, Ballpeb & Pebble Mills
	Multi-Stage	Compeb (1, 2, 3 or 4 Stage) Ballpeb (Fine Grinding Only)
VIBRATING SCREENS	Coarse Materials	Style "C" Style "B", Centrifugal Low Head, Horizontal Ripl-Flo
	Light & Fine	Aero-Vibe Electro-Magnetic Laboratory Low Head Gyratory Sifters
HANDLING	Conveyors	Pan, Apron, Spiral Elevators Electro-Magnetic
	Feeders	Rotary, Ferris-Wheel, Cantilever Grizzly, Cone, Swing, Table Types Electro-Magnetic Pan, Apron, Spiral
PYRO-PROCESSING	Hoists	Electric Friction
	Rotary Kilns	Portland Cement, Lime, Lime Sludge, Alumina, Magnesia, Ore Concentrates
	Dryers, Roasters	Multiple & Flat Hearth Furnaces Blast & Reverberatory Furnaces Rotary Dryers Nordyke Rotary Steam Dryers
	Coolers (Heat Recuperating)	Air Quenching Direct Rotary Indirect Rotary Tube Type Rotary

BUILDS ALL TYPES

the Exact Type Suited to Your Particular Needs!

One thing you have is ADDED EXPENSE!

STANDARD Thickness pipe is not ordinarily called heavy pipe. To most pipe users it is simply the pipe used for all services where still heavier pipe is not needed. But when you get down to the facts this is an expensive assumption.

Compared to Taylor Spiral Pipe—a pipe that can replace it in a great many of the uses to which it is put—Standard Thickness pipe *is* a heavy type. It weighs about twice as much as Taylor Spiral Pipe. Think what that means!

In Taylor Spiral Pipe the spiral welded seam, running from end to end, makes it the strongest type of pipe on earth, pound for pound and gauge for gauge. The light weight, without sacrificing strength, cuts initial cost, transportation cost, handling cost, installation cost. As a result, the installed cost in many cases is no more than half that of the heavy pipe it so adequately replaces. Equally important today is the saving of vital steel.

Take Taylor Spiral Pipe into your calculations. It will save you time and dollars. Switching to Taylor Spiral Pipe for services like those listed here is made easy by the complete range of sizes and wide variety of fittings. Thicknesses range from 18 to 6 gauge; sizes from 4″ to 42″; joint lengths up to 40 ft. All types of end joints and couplings, all kinds of fittings and specials or fabricated assemblies, are produced by Taylor Forge, assuring a complete service and undivided responsibility.

TAYLOR FORGE & PIPE WORKS

General Offices & Works: Chicago, P. O. Box 485 ★ New York Office: 50 Church St. ★ Philadelphia Office: Broad Street Station Bldg.

CHANGE TO TAYLOR SPIRAL PIPE FOR:

- High and Low Pressure Water Lines
- Low Pressure Steam and Air Lines
- Steam and Diesel Exhaust Lines
- Vacuum and Suction Lines
- Blower Piping
- Sand and Gravel Lines
- Industrial Gas Lines
- Oil and Gas Gathering Lines
- Swing Pipe
- Spray Pond Piping
- Hydraulic Mining
- Dredge Lines

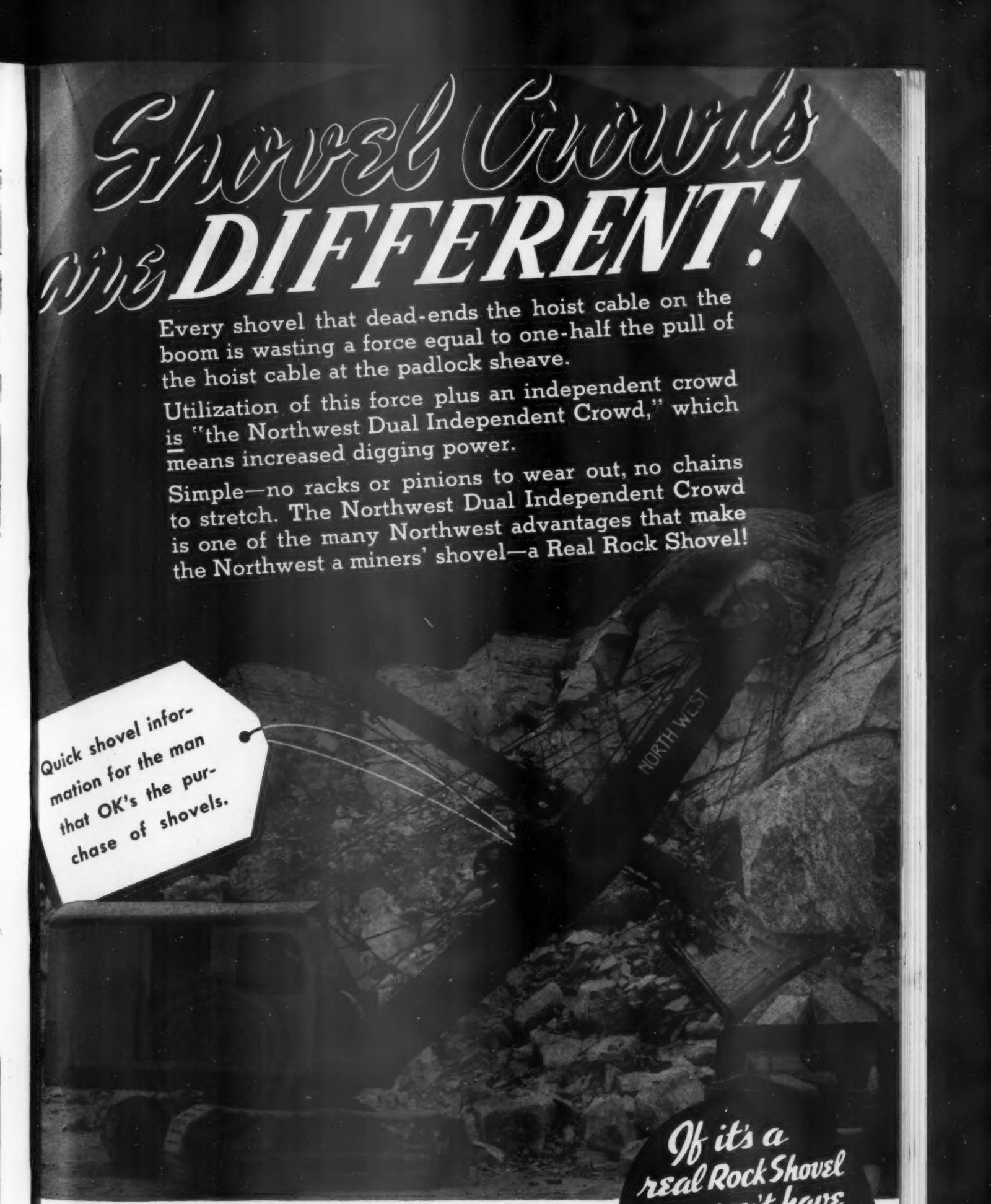
PRINT IN BINDI

Shovel Crowds are DIFFERENT!

Every shovel that dead-ends the hoist cable on the boom is wasting a force equal to one-half the pull of the hoist cable at the padlock sheave.

Utilization of this force plus an independent crowd is "the Northwest Dual Independent Crowd," which means increased digging power.

Simple—no racks or pinions to wear out, no chains to stretch. The Northwest Dual Independent Crowd is one of the many Northwest advantages that make the Northwest a miners' shovel—a Real Rock Shovel!



Quick shovel information for the man that OK's the purchase of shovels.

If it's a real Rock Shovel you won't have to worry about output in dirt

ORTHWEST ENGINEERING CO., 1822 Steger Bldg., 28 E. Jackson Blvd., Chicago 4, Ill.

NORTHWEST

Convertible for any Mining, Material Handling or Excavation Problem

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Use Rock Drills?

THEN WRITE FOR THE NEW Cleveland Catalog!

• Over 150 handsomely illustrated pages, describing Cleveland rock drilling equipment—you will find that and plenty more in our new Catalog 42R. Here are some of the subjects covered:

Detailed information about Cleveland Sinkers, Paving Breakers, Clay Diggers and Tampers, Drifters, Stopers, Wagon Drills and Accessories.

Helpful instructions, in cartoon style, about operating and maintaining Rock Drills.

Valuable information about getting more work out of your Paving Breakers.

Complete description of our other products, including Cleco pneumatic tools.

Write today for your free copy of Catalog 42R.

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Power is one of America's most vital war weapons, for by it are all other weapons produced. Getting that power from its primary source to the driven machinery with minimum loss is a job many plants have given to Wood's Planned Power Transmission Equipment. Evidence aplenty indicates that it is performing the task well, without unnecessary time-losing shut-downs and with minimum maintenance.

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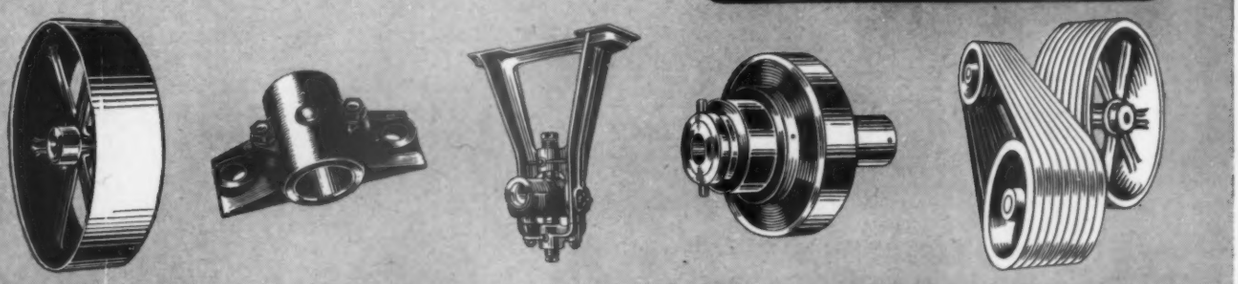
the LONG LIFE LINE



T. B. WOOD'S SONS COMPANY, CHAMBERSBURG, PENNA.

BRANCHES: 387-391 ATLANTIC AVE., BOSTON, MASS. • 83 PLANE ST., NEWARK, N. J. • 425 FIRST AVE., PITTSBURGH, PA.

YOU'LL FIND NO "OIL HOGS" HERE

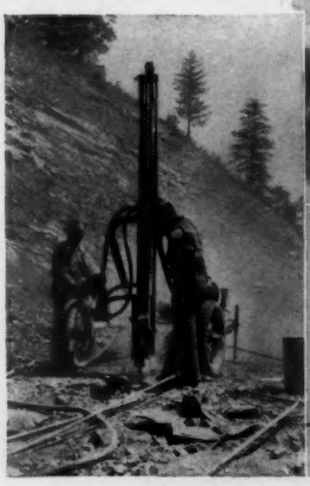
NOT with Gardner-Denver Water Cooled Portable Compressors on the job!

Because they are fully water cooled, they run cooler—use less lubricating oil. Rarely is it necessary to add any oil between regular oil changes.

And because they run cooler, they deliver cooler air—cause less wear on hose.

You'll find Gardner-Denver "Portables" equally efficient in winter or summer—at high altitudes or low. In winter, warm water from the engine circulates through the cylinder jackets, thoroughly warming the compressor before it is started. In summer, the circulating water keeps the compressor cool.

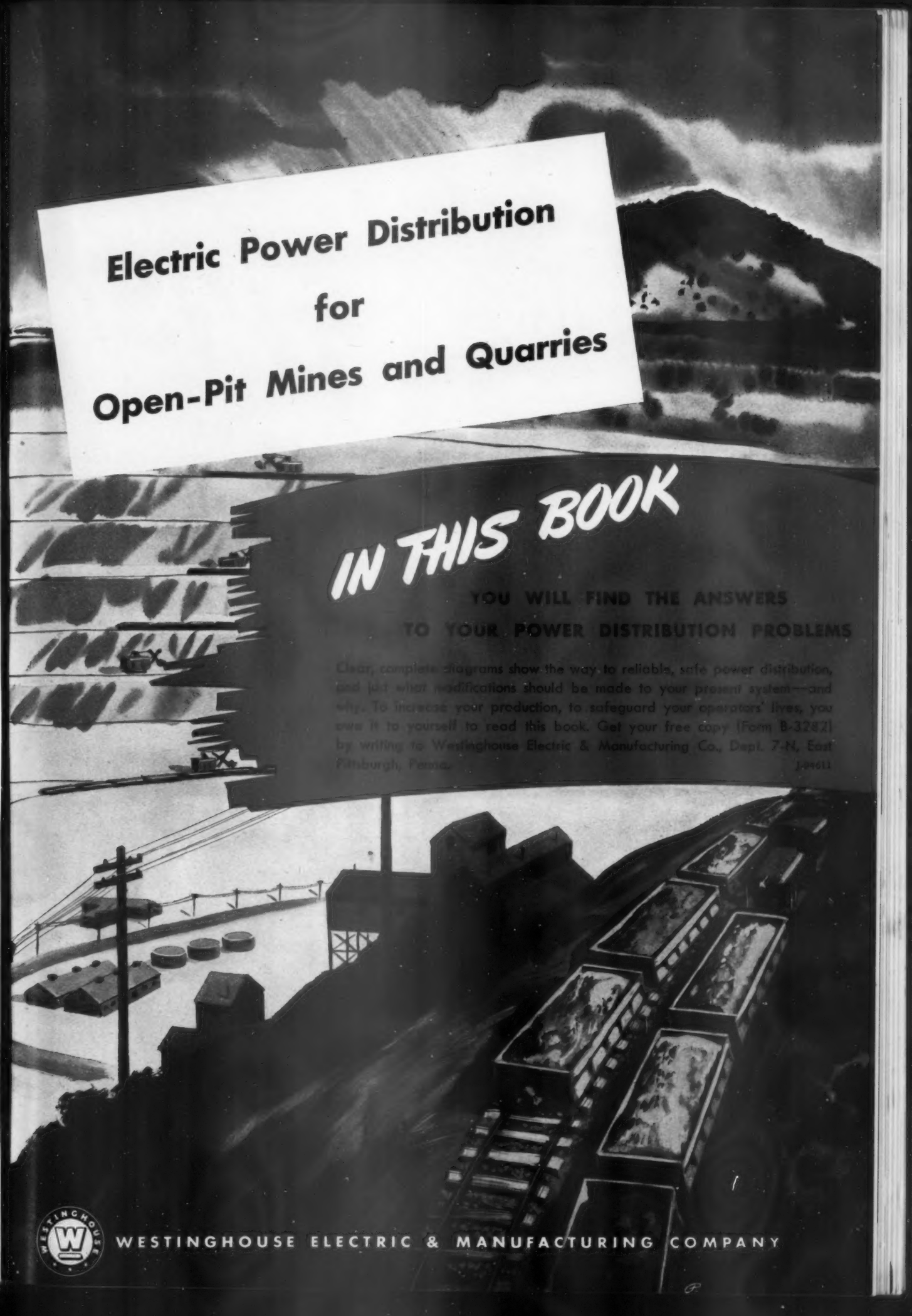
Investigate these "oil saving" water-cooled compressors and other Gardner-Denver cost-cutting equipment. Write Gardner-Denver Company, Quincy, Illinois.



For faster drilling and extra maneuverability, even over the roughest ground, check the Gardner-Denver UM-99 Wagon Drill. Ability to handle full six-foot steel changes quickly, means faster drilling on deep holes.

GARDNER-DENVER

Since 1859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for
Open-Pit Mines and Quarries
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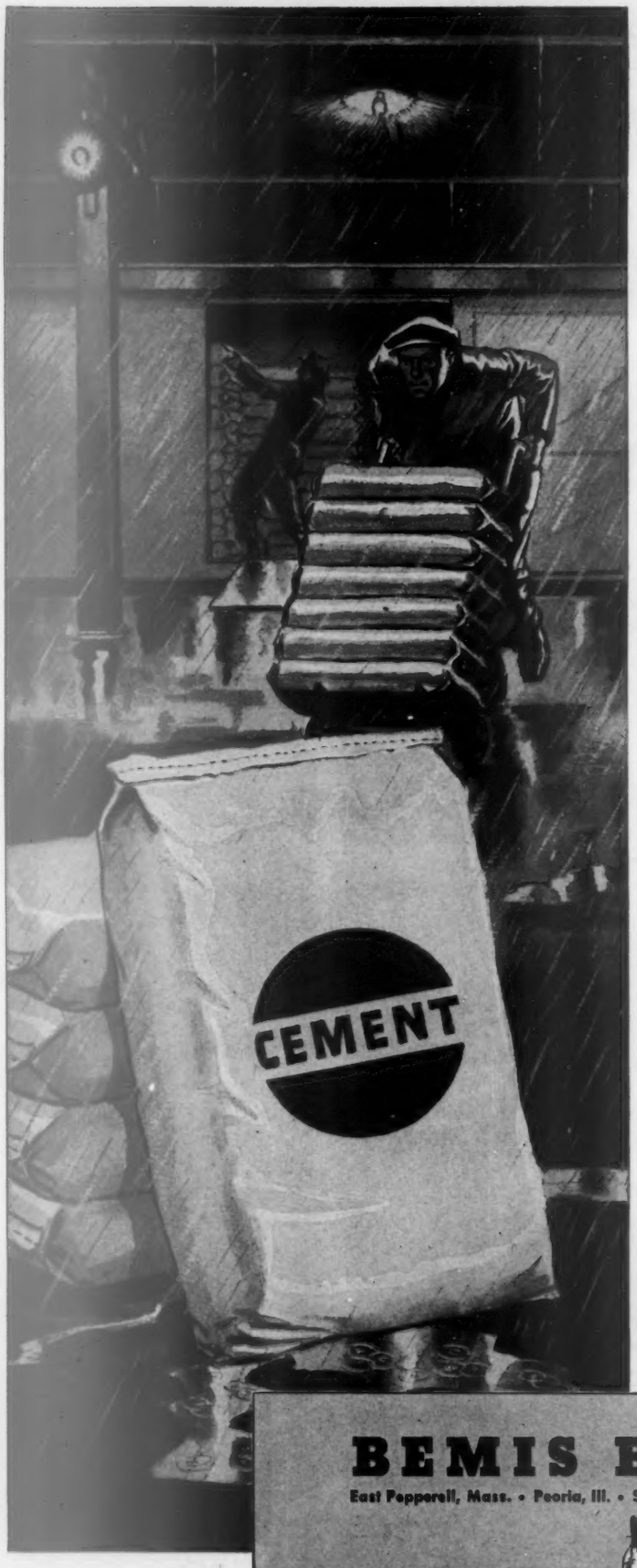
Clear, complete diagrams show the way to reliable, safe power distribution, and just what modifications should be made to your present system—and why. To increase your production, to safeguard your operators' lives, you owe it to yourself to read this book. Get your free copy (Form B-3282) by writing to Westinghouse Electric & Manufacturing Co., Dept. 7-N, East Pittsburgh, Penna.
J-94611
WESTINGHOUSE ELECTRIC & MANUFACTURING COMPANY



TRY THIS!

and prove to yourself that BEMIS MULTIWALL PAPER BAGS are showerproof

TAKE a Bemis Multiwall Paper Bag, filled with your cement, and set it out in the weather. Let it rain . . . let it pour! (If the air is filled with sunshine around your plant, use a hose to simulate rain.)

After you're convinced that the bag has been in more weather than it ever will have to stand in ordinary use, let it set 'til it's dry. Then open it, and see how freely the cement pours out!

Protection against sudden showers is only *one* advantage of using Bemis Multiwall Paper Bags to package your cement. You'll find that these containers are economical . . . that they have strength to reduce lost time due to breakage on the production line . . . that they have ruggedness to protect your product in transit and on the job.

We'd like to have you know about the qualities of Bemis Multiwall Paper Bags before you place another bag order. So, we suggest you try this experiment soon. We'll send sample bags for the trial, if you'll ask for them. No charge and no obligation, of course.

BEMIS BRO. BAG CO.

East Pepperell, Mass. • Peoria, Ill. • San Francisco, Calif. • Wilmington, Calif. • St. Helens, Ore.

OFFICES: Baltimore • Boston • Brooklyn • Buffalo • Charlotte • Chicago • Denver • Detroit • Houston • Indianapolis • Kansas City • Los Angeles • Louisville • Memphis • Minneapolis • New Orleans • Norfolk • New York City • Oklahoma City • Omaha • St. Louis • Salina • Salt Lake City • Seattle • Wichita

Only HENDY DIESELS Combine all these Features!

GENERAL SPECIFICATIONS
SERIES 50

Bore—12"; Stroke—15"
Speed—250 to 600 RPM
Rated Power at 450 RPM—
75 hp. per cyl.

Write for complete data on the Hendy Series 50 Diesel Engine

- Unit-type fuel-pump injectors
- Dual alloy-steel intake and exhaust valves
- Jet action cooling in cylinder head
- Cross-heads which eliminate side thrust from rocker arm
- Hydraulic tappets that eliminate valve adjustments in service
- Overhead-type camshaft
- Centrifugally cast, babbitt-lined, steel-backed bearings
- Double bearing at flywheel end
- Rigid steel engine bed
- Welded-steel cylinder block with sleeve liners
- Forged-steel or cast-alloy crankshaft
- Forged-steel connecting rods
- Oil-cooled cast-iron pistons
- Cage-type relief valve and compression release
- Improved type camshaft chain drive system
- Auxiliaries engineered to suit application
- Integral fresh-water cooling
- Positive, full-automatic lubrication
- Mechanical or hydraulic governing
- Water-cooled exhaust manifold
- Starting and operating controls centralized at gauge board
- Friction clutch for power takeoff, as optional equipment

For simplicity — long life — for modern design — look to Hendy!

JOSHUA HENDY Division
JOSHUA HENDY IRON WORKS

ESTABLISHED 1850

SUNNYVALE, CALIFORNIA

HENDY

BRANCH OFFICES: Buffalo • Chicago • Cincinnati • Cleveland • Detroit • New York • Philadelphia • Pittsburgh • San Francisco • St. Louis • Washington • Los Angeles

HOISTS

MINE CARS

CRUSHERS

BALL MILLS

"RING-FREE Exceeded Our Expectations!"

Quoting the GENESEE SAND AND GRAVEL CORP., Buffalo, New York: "After buying and using your oil since October 27, 1937, we enjoyed a wonderful experience with regard to maintenance, upkeep and saving of fuel which we believe exceeds by ten per cent any advertising that your Company had published. When first purchased it far exceeded our expectations and we thought this could not be possible so we went through one year, then another, and it has reached six years and four months and we are still as pleased with results as we were when we first started using it."

Many Pit and Quarry men agree that *all* motorized equipment (gasoline and Diesel) delivers performance they're proud of when lubricated with Macmillan RING-FREE Motor Oil. They get more usable power—dependable power—under toughest operating conditions because RING-FREE reduces friction *fast.* That naturally reduces wear and repair and saves fuel!

Macmillan RING-FREE *removes* carbon while your engines run! Changing to RING-FREE means getting a motor that has to run sweeter. It benefits fully from the rapid, thorough penetration, high film strength, high heat resistance and long cling of RING-FREE.

A trial and comparison of RING-FREE on the basis of complete records of operating performance and economy is welcomed by Macmillan representatives.

MACMILLAN RING-FREE MOTOR OIL

MACMILLAN PETROLEUM CORPORATION

50 W. 50th Street, New York 20 • 624 S. Michigan Avenue, Chicago 5 • 530 W. 6th Street, Los Angeles 14

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REDUCES WEAR BY REDUCING FRICTION

That dynamic progress which says "This is America"! is nowhere so great as in the production of Raybestos friction materials for you. ★ Practically everything that is power-driven on land, sea or in the air requires brake linings and clutch facings for safe, smooth control. And the amazing advancements in the speed, power and performance of this equipment have called for like advancements in the production of friction materials. ★ Raybestos has won leadership in this basic industry. Raybestos advanced friction materials anticipate the ever-changing, ever-challenging requirements of American progress—in their design, their development and their use.

THE RAYBESTOS DIVISION of *Raybestos-Manhattan, Inc.*, BRIDGEPORT, CONN.

Raybestos

FRICTIONEERS to AMERICA

INVEST IN AMERICA
BUY BONDS ★

Manufacturing the most complete line of highest quality metallic and non-metallic brake linings and clutch facings for every type of equipment, war and civilian. Also fan belts and hose. ★

THEY LOOK ALIKE...

DU PONT Electric Blasting Caps are the product of careful research backed by years of manufacturing experience. They are made by skilled workmen using modern precision methods. They look alike and they *are* alike.

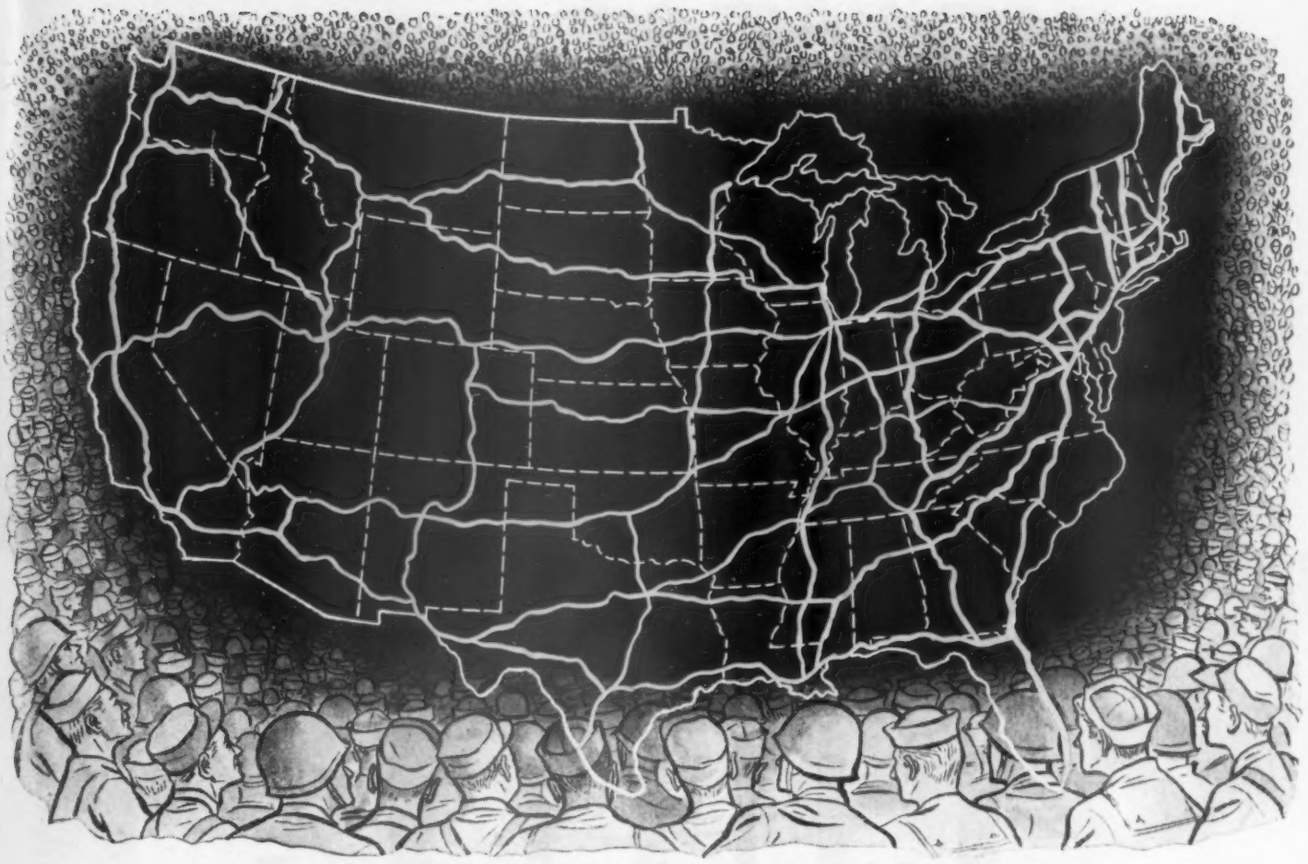
Du Pont Electric Blasting Caps are well known for their dependable performance. They reduce misfires and as a result help increase production. That is why well over a billion of these caps have already been used. They're the best known, fastest selling electric blasting caps on the market.

Ask any Du Pont Explosives Department representative for full details about these caps. And use them yourself. You'll soon agree . . . Du Pont Electric Blasting Caps are dependable, and the most dependable detonator is the safest detonator.

E. I. du Pont de Nemours & Co. (Inc.), Explosives Department, Wilmington 98, Delaware.

DU PONT *Electric* BLASTING CAPS

DU PONT
REG. U.S. PAT. OFF.



PLANNED POSTWAR HIGHWAY PROGRAM MEANS

Quick Employment For 3 Million

No one wants another depression 13,000,000 people deep. It will be much better to measure the height of national prosperity by the number of people employed.

Since it is generally agreed that gainful employment is the No. 1 factor in the national economy, it is to every American's best interest to get behind and push forward every sound postwar plan. *One such is that of the American Road Builders' Association.*

It is sound because it will quickly and directly employ 3,000,000 people on a planned highway building program sorely needed before the war and absolutely necessary postwar.

It is sound because it eliminates attempts to fill depressions with improvised work relief amply demonstrated to be slow, costly, inefficient, and demoralizing.

It is sound because it is based upon plans and specifications carefully prepared in advance, cost estimates made in advance by public engineers, bids made by competing contractors who are willing to back up their judgment with their own funds, and the requirement of ample bond to further guarantee the delivery of quality work at contract costs and on time.

It is sound because it makes more efficient use of on-site employment and affords far more off-site employment in the production of materials and equipment. Thus, in addition to stimulating the consumer goods market, it induces far reaching employment throughout the production, transportation, and service industries. Studies made by the U. S. Public Roads Administration indicate that the proposed investment of 3 billion dollars annually in highways eventually results in business transactions totaling 9½ billion dollars.

Every American who wants to get early enjoyment of a better planned highway system, constructed better at the lowest bid cost, should write for and read the 64-page book entitled "A Sound Plan For Postwar Roads and Jobs." Among other things it points out that nearly enough in motor vehicle taxes is normally collected to pay for this sound, planned program if used for the purpose intended.

WRITE FOR THIS FREE BOOK... E-44

Address

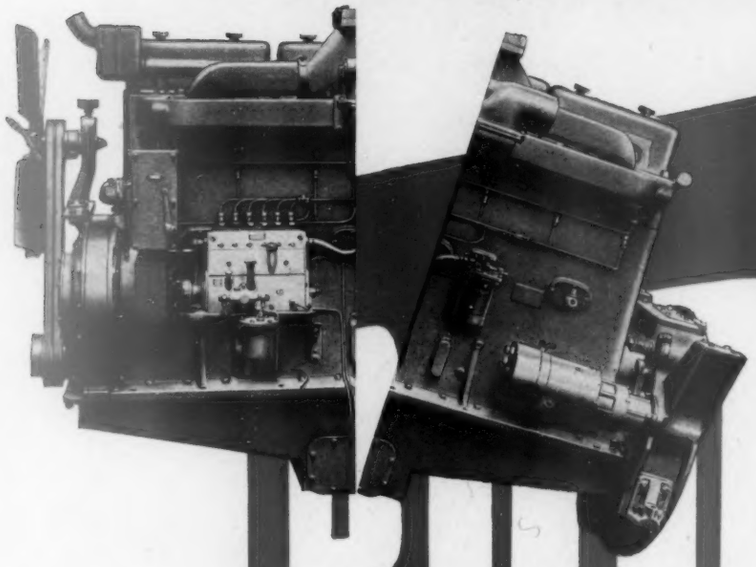
AMERICAN ROAD BUILDERS' ASSOCIATION, 1319 F Street, N.W., Washington 4, D.C.

OR

UNION WIRE ROPE CORPORATION, 2132 Manchester Ave., Kansas City 3, Missouri

AS YOU BACK THE ATTACK GUARD AGAINST A FUTURE SLACK

NEGLECT CUT THE LIFE of this engine in half...



BUDA

...ARE YOU TAKING CARE OF YOURS?

THE many years of useful service built into your Buda engine are the result of painstaking care in design, selection of materials and skilled workmanship. Give your engine the same care in lubrication and regular maintenance, and you'll get every hour of smooth performance out of it. Start regular engine maintenance now . . . keep your engine on the job for Victory! Your Buda distributor will gladly help you — see him today.

the BUDA Co.

HARVEY (Chicago Suburb) ILLINOIS

Get in the Scrap

. . . don't make it!

Every engine part you save means one more for the battlefront. Take care of your engine *regularly*—check your instruction book for details on lubrication and service.

ORDINARY DIESELS

. . . High cylinder pressures produce sledge-hammer blows that punish pistons, rods and crankshaft every power stroke.

BUDA
Low-Pressure DIESELS

Prolonged "Low-pressure" combustion delivers a smooth, steady power stroke that cuts vibration saves parts.

Here's Profitable Planning Help for

LeTourneau units have literally scores of profitable uses in pits and quarries. To

PRINT IN BINDI

LeTourneau units have literally scores of profitable uses in pits and quarries. To help you determine where they fit into your work, we've developed this chart of major and secondary applications. Study it. If you're not using LeTourneau equipment on the checked applications (every one proved practical by actual use), see your LeTourneau dealer.

★ Major use ● Secondary use

Here's Profitable Planning Help for *You*

Study this Chart . . See Where LeTourneau Stripping and Materials Handling Equipment Can Help You Make More Money

		SUPER C TOURNA-PULL** (Capacity—15 heaped yards)	SUPER C TOURNA-CRANE** (Lifting cap. up to 20,000 lbs.)	SUPER C TOURNA-TRAILER** (Capacity—17 heaped yards)	MODEL D TOURNA-PULL*** (Capacity—2.3 heaped yards)	MODEL F TOURNA-CRANE*** (Lifting cap. up to 10,000 lbs.)	MODEL D TOURNA-TRUCK*** (Capacity—5 tons)	POWER CONTROL UNITS*	CARRYALL SCRAPERS (for all tractors fitted with PCU's)	ROOTERS (for all tractors fitted with PCU's)	TRACTOR CRANES (for all tractors fitted with PCU's)	DOZERS (for all "Caterpillar" tractors)
CLEARING:	Clear new pit areas, plant sites, roads							★		★		★
PIONEERING:	Open sidehill cuts							★		★		★
STRIPPING:	Overburden removal	★		★	●			★	★	★		★
MATERIALS HANDLING:	Dig sand and gravel	★			●			★	★	★		★
	Haul aggregates	●		★	●			★	●			
	Load cars, trucks by ramp	★		★	★			★	★			★
	Stockpile materials	★		★	★			★	★			★
EARTH CONSTRUCTION:	Build roads	★		●	★			★	★	★		★
	Road maintenance	●			★			★	★			★
	Build railroad grades	★		★	★			★	★	★		★
OTHER JOBS:	Move spoil banks	★		★	●			★	★	●		★
	Feed shovels, draglines							★				★
	Feed hoppers	★		★	★			★	★			★
	Pit clean-up							★				★
	Load, unload flatcars, trucks		★			★		★			★	
	Move machinery, supplies		★			★	★	★			★	
	Erect structural forms		★			★		★			★	
	Other heavy lifting and moving jobs		★			★	★	★			★	

Don't take a chance of going into the "red" with slow, outdated equipment on your postwar plans. Ask your LeTourneau dealer how the rubber-tired power of Tournapulls and the big capacity of LeTourneau units can get your jobs done faster and at lowest net cost. See him NOW.

*for all "Caterpillar" tractors; Allis-Chalmers L, L-O, HD10, HD14, S, SO; International TD40, TD18, TD14; Cletrac FD, FG, DD, DG, CG.

**15-yd. Carryall Scraper, 17-yd. Tournatrailer and Tournacrane (20,000 lb. lifting capacity) interchangeable on same Super C Tournapull prime mover.

***2.3-yd. Carryall Scraper, Tournacranes (4,000 to 10,000 lbs. lifting capacities) and 5-ton Tournatruck interchangeable on same Model D Tournapull prime mover.

LETOURNEAU

PEORIA, ILLINOIS • STOCKTON, CALIFORNIA

High-Speed, Heavy-Duty Earthmoving Equipment

TAMPTITE

SAVES TIME · SAVES LABOR · PACKS SNUGLY · GIVES BETTER BREAKAGE

1 **FASTER LOADING** of bore holes is possible with Tamptite because there is no wasted time splitting cartridges, no fuss or bother. You simply insert a Tamptite cartridge and tamp.

2 **TIGHTER CHARGING** is bound to result because both dynamite and the Tamptite wrapper expand to fill the bore hole tightly, snugly. Virtually no air space remains around the charge.

Order your favorite Hercules explosives in Tamptite cartridges. All the customary grades and sizes of Hercules Gelamites*, Hercomites*, Extra Gelatins, Gelatins, and Extra Dynamites are available in this time-saving wrapper.

3 **BETTER BREAKAGE** of the ore or rock occurs because the entire charge is concentrated exactly where you want it. The result is speedier mucking and a faster mining cycle.

HERCULES
EXPLOSIVES

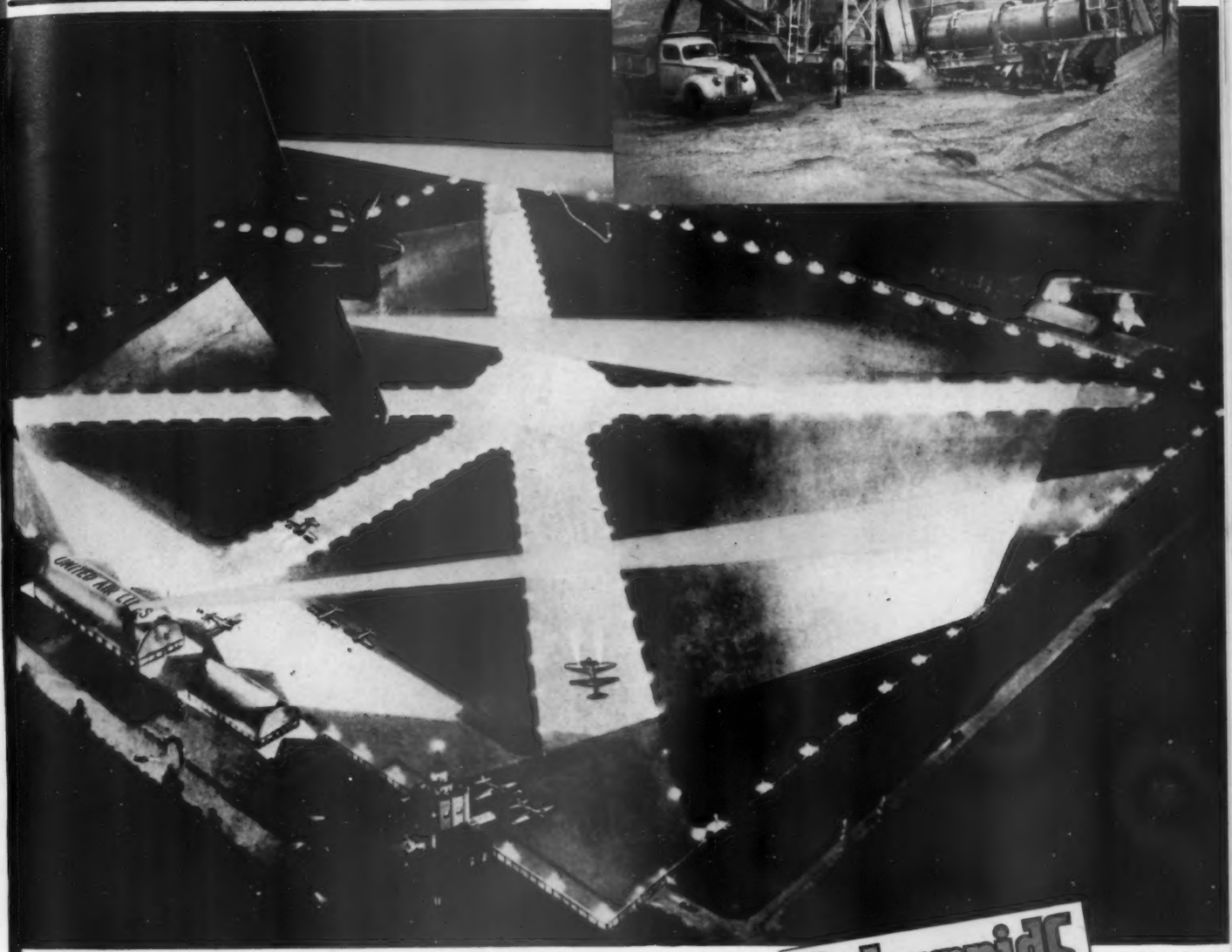
HERCULES POWDER COMPANY INCORPORATED ..... 960 KING STREET · WILMINGTON 99, DELAWARE

*REG. U. S. PAT. OFF.

XR-42

ORDER HERCULES EXPLOSIVES IN TAMPTITE CARTRIDGES

AMERICA IS *Built with Aggregate!*



— Photo by —
Ewing Galloway

HIGHWAYS TO THE SKY!

To the global airlines, highways to the sky are runways that are safe, smooth, permanent, and have tremendous load-carrying capacity. The engineer and contractor see them as aggregate at so many cents per yard. And, that price has to be the lowest possible.

Refinements in crushing equipment are lowering production costs despite increasingly strict specifications. Such improvements are the result of American free enterprise which developed the line of Cedarapids plants.

When you have a contract to build tomorrow's HIGHWAYS TO THE SKY, use aggregates produced by Cedarapids crushing plants. All sizes and types available. You'll get better results and it will cost you less.

Remember it's Iowa — headquarters for Aggregate Producing Equipment!

IOWA MANUFACTURING COMPANY
CEDAR RAPIDS, IOWA

Cedarapids
Built by IOWA

THE IOWA LINE

of Material Handling Equipment Includes

ROCK AND GRAVEL CRUSHERS
BELT CONVEYORS — STEEL BINS
BUCKET ELEVATORS
VIBRATOR AND REVOLVING SCREENS
STRAIGHT LINE ROCK AND GRAVEL PLANTS
FEEDERS — TRAPS
PORTABLE POWER CONVEYORS
PORTABLE STONE PLANTS
PORTABLE GRAVEL PLANTS
REDUCTION CRUSHERS
BATCH TYPE ASPHALT PLANTS
TRAVELING (ROAD MIX) PLANTS
DRAG SCRAPER TANKS
WASHING PLANTS
TRACTOR-CRUSHER PLANTS
STEEL TRUCKS AND TRAILERS
KUBIT IMPACT BREAKERS

G. I. finds a friend

G. I. (as the Yank soldier prefers to call himself) has to handle a lot of wire rope these days. On landing barges . . . on cranes, hoists, and power shovels . . . and especially on trucks and tanks, most of which carry an emergency winch cable as standard equipment. For such uses, Bethlehem has supplied millions of feet of wire rope—much of it in our top-quality Form-Set (preformed) construction.

When a truck is mired, or when there's a heavy hauling job to be done, the G. I. winch cable is a friend in need. And when it's supple, easy-handling Form-Set it's doubly a friend. That means a lot to G. I., who as likely as not was a traveling salesman or grocery clerk in civilian life, and had no experience in handling wire rope.

Because its strands and wires are preformed in their corkscrew shape, Form-Set is free from locked-up constructional tensions. It's easy to splice and spool, requires no seizing, and sprouts no spiny wire bristles to slash the hands of men who work with it. All of which explains why Government agencies have bought it in such vast quantities for military operations.

You get the utmost in service and long life from Form-Set when it's in the Purple Strand grade. Purple Strand wire rope is made of strong, tough Improved Plow Steel, the highest-quality steel that's used in wire-rope construction.

In Form-Set Purple Strand you get the ideal combination of preformed ease of handling with the unmatched strength and ruggedness of Improved Plow Steel. Plan to order it for your next wire rope job, or for replacements. But make your plans, please, as far in advance as possible, so that you will be sure to have Form-Set Purple Strand Wire Rope when you need it.

Form-Set
Purple Strand
Wire Rope

★ ★ BETHLEHEM STEEL ★ ★

A PATTERN FOR PROGRESS

It is a basic belief at Thermoid that no one prospers alone . . . that success for worker, owner and customer is interdependent; and that employee welfare is governed by individual striving to advance the interests of all.

This concept of a common good by Thermoid men and women is unusual in so large a group. It is that sense of proprietorship and personal responsibility felt by the employee who works alongside the owner's bench or desk. And it is bred, here at Thermoid, by the same intimate employee knowledge and understanding of the business that unifies effort in the small shop. It is fed by sharing problems and profits.

Speaking to every member of the Thermoid family—in annual reports like the one pictured here—President Schluter gives fullest expression to his belief that "employees do a lot of thinking for themselves; and the more a man knows about the thinking behind his job, the more worthy his work will be."

What Thermoid does . . . what it makes . . . what it sells—and how and where . . . what taxes it pays . . . its wage rates . . . its earnings . . . its dividends and reserves . . . its plans and its problems! All are set forth frankly in the Thermoid Annual Report to Employees as matters of mutually helpful information.

This fuller knowledge of company relationships, with the better understanding of their mutual problems by every worker, is largely responsible for Thermoid's consistent progress. It patterns the cooperation that gets things done RIGHT . . . that causes Thermoid customers to say: "It's good business to do business with Thermoid."

THE THERMOID LINE INCLUDES: TRANSMISSION BELTING • F.H.P. AND MULTIPLE V-BELTS AND DRIVES • CONVEYOR BELTING • ELEVATOR BELTING • WRAPPED AND MOLDED HOSE • SHEET PACKINGS • INDUSTRIAL BRAKE LININGS AND FRICTION PRODUCTS • MOLDED HARD RUBBER AND PLASTIC PRODUCTS.

Thermoid Rubber

DIVISION OF THERMOID CO.

TRENTON, NEW JERSEY

Don't put it off 'til tomorrow— BUY MORE WAR BONDS TODAY!

It's Good Business to Do Business with Thermoid

QUICK ACTION

It's the Power and Speed that Counts . . . Koehring speed and power saves seconds in shovel operations . . . the surest way to increase production. Victory demands a greater output, and Koehring Shovels have the reserve power to provide it. The wartime service needed is available in your Koehring Shovel with little time out for breakdown or repair. Be sure to keep your shovel well lubricated . . . replace worn parts before failure . . . never misuse your shovel in any way . . . and it will exhibit a performance that counts in increasing production.

. . . DEPEND ON YOUR KOEHRING DISTRIBUTOR to help you keep your equipment operating. Care for your Koehring equipment NOW, so it will serve you tomorrow. Koehring distributors have genuine Koehring parts. Koehring parts warehouses are at your service.

KOEHRING HEAVY DUTY

ARMY E NAVY

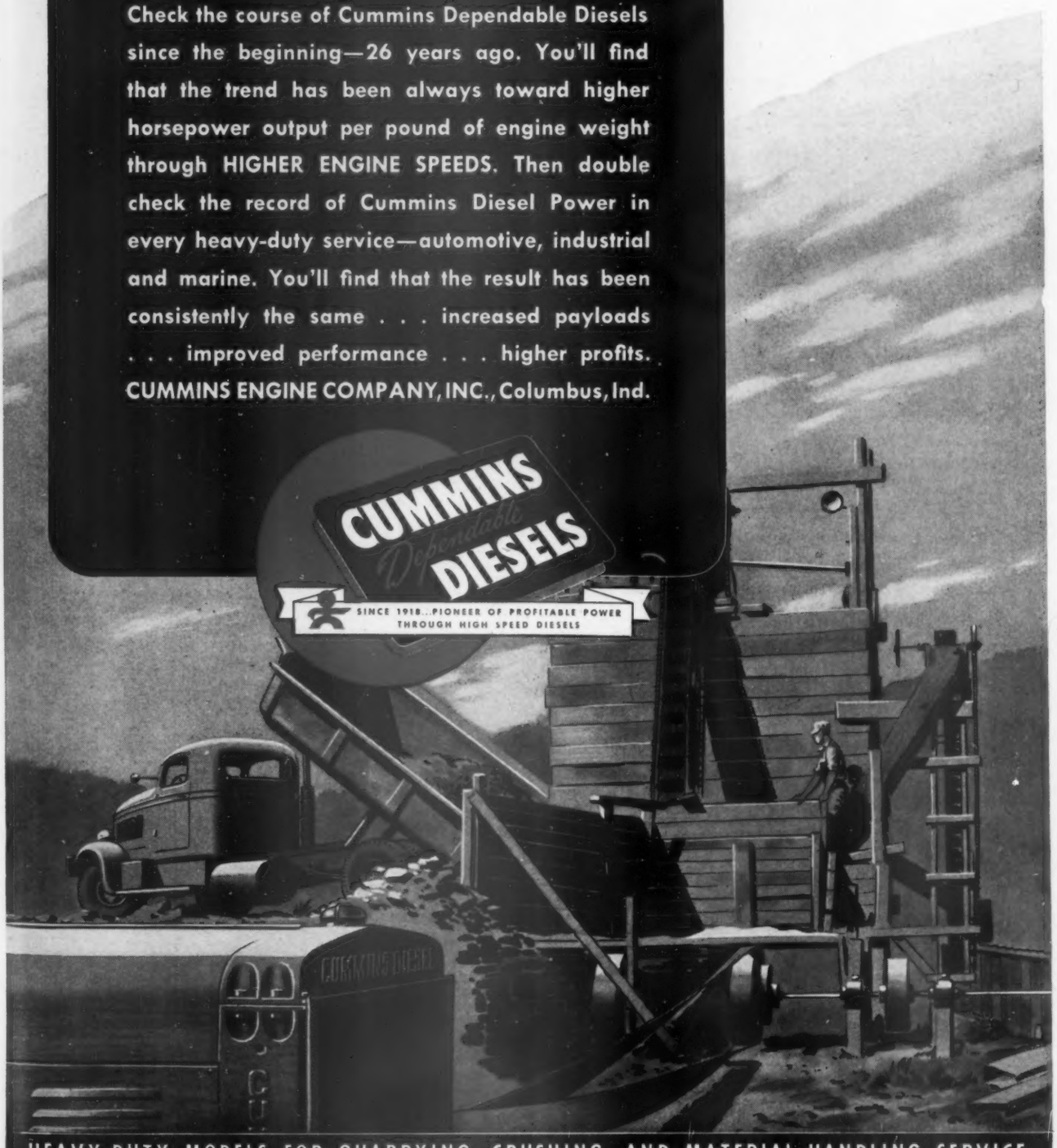
KOEHRING COMPANY *Milwaukee 10, Wisconsin*

HEAVY-DUTY CONSTRUCTION EQUIPMENT

CHECK AND DOUBLE CHECK

Check the course of Cummins Dependable Diesels since the beginning—26 years ago. You'll find that the trend has been always toward higher horsepower output per pound of engine weight through HIGHER ENGINE SPEEDS. Then double check the record of Cummins Diesel Power in every heavy-duty service—automotive, industrial and marine. You'll find that the result has been consistently the same . . . increased payloads . . . improved performance . . . higher profits.

CUMMINS ENGINE COMPANY, INC., Columbus, Ind.



HEAVY-DUTY MODELS FOR QUARRYING, CRUSHING, AND MATERIAL HANDLING SERVICE

W

The Case of "SLATE DISPOSAL HEADACHES"

How a large bituminous coal producer solved a most troublesome problem

THE COMPANY AND PROPERTY: The Weirton Coal Company, Isabella Mine, located in Southwestern Pennsylvania.

THE PROBLEM: Aerial tram equipment lacked adequate capacity to remove all of the slate and mine refuse of present peak operations — continued steady use of tram would necessitate costly moving of towers in two or three years. Use of small trucks to supplement tram for slate disposal was tried but proved to be unsatisfactory because of high operating and maintenance costs.

THE SOLUTION: Five small trucks were replaced by two Model 2FD Rear-Dump EUCLIDS of 15-ton capacity. One of the Euclids is used as a standby unit because of the six day 'round the clock operation. Both the aerial tram and second Euclid are put into service only at peak periods, a single Euclid being adequate to handle average output of slate.

THE RESULT: The company has reduced their cost of hauling and dumping slate and refuse, and has greatly prolonged the usefulness of the aerial tram in its present location. The standby Euclid is used one or two shifts each week to haul coal for the company's beehive coke ovens. When the two Euclids were purchased to replace the small trucks, it was thought that steady operation of the aerial tram would have to be continued, but the speed and capacity of the Rear-Dump EUCLIDS has made tram use unnecessary except at peak periods.

● If you have a problem of moving large amounts of earth, ore, rock, or coal on off-the-highway hauls, call on your Euclid distributor or write us direct if you prefer. A recommendation based on practical applications of Euclid equipment on similar jobs involves no obligation.

The EUCLID ROAD MACHINERY Co. · · · Cleveland 17, Ohio

EUCLID SELF-POWERED HAULING EQUIPMENT For EARTH ROCK COAL ORE

EUCLID THE PIONEER

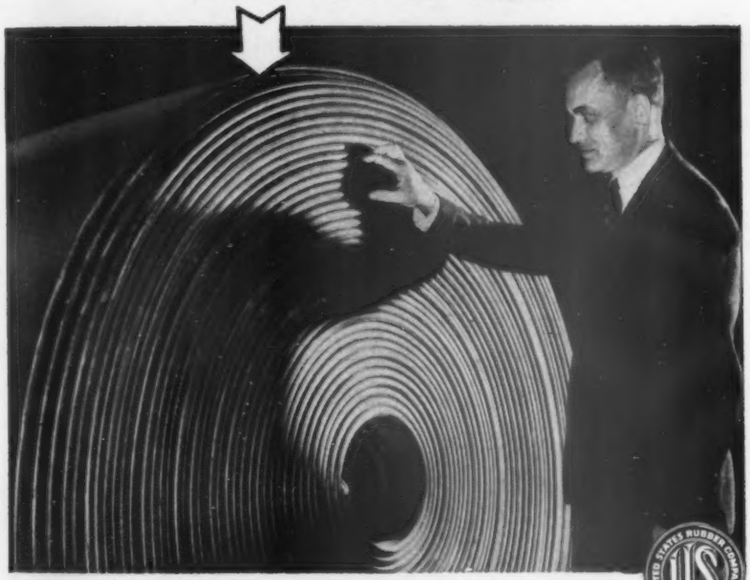
"THIS *is synthetic rubber*"

One is a raw material... the other a finished synthetic rubber conveyor belt, made by United States Rubber Company for tough wartime service. Between the two lies a wealth of applied scientific knowledge, technical skill and compounding experience.

For years we have been making conveyor belts with synthetic rubber for special installations. This was in keeping with our policy to design and build each conveyor belt to meet the specific conditions involved.

Now that synthetic rubber is a "must" for all conveyor belts this policy continues... every U.S. Conveyor Belt is engineered to meet all physical and chemical forces encountered in its individual conveying job—also to have the essential characteristics of flexibility, for proper troughing, and perfect alignment.

"AND *so is this*"



SERVING THROUGH SCIENCE

THEY'RE FLEXIBLE—THEY TROUGH—THEY'RE ALIGNED... Hundreds of thousands of feet of U.S. Rubber Conveyor Belting are helping today to handle ore, coal, limestone and many other types of bulk material used in the manufacture of America's war products.

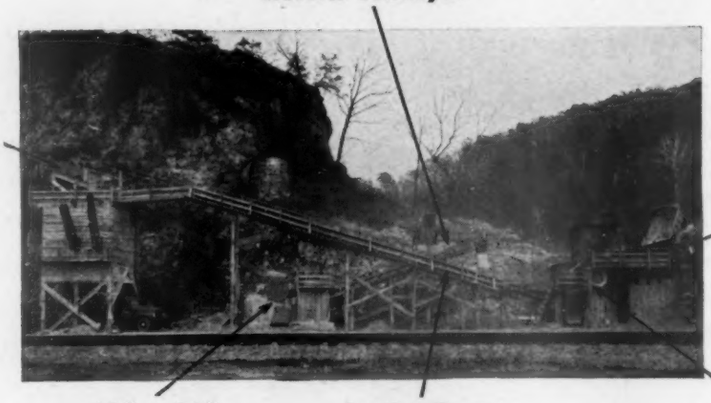
Listen to the Philharmonic-Symphony program over the CBS network Sunday afternoon, 3:00 to 4:30 E.W.T. Carl Van Doren and a guest star present an interlude of historical significance.

UNITED STATES RUBBER COMPANY

1230 SIXTH AVENUE, ROCKEFELLER CENTER, NEW YORK 20, N. Y. • *In Canada:* DOMINION RUBBER CO., LTD.

1,000 TONS per DAY

with Universal Standard 6 Unit Plant



Over 100 tons per hour, 1,000 tons per day—day after day—of ballast, mostly 1½″ and 1″, are being turned out at minimum cost for the Burlington Railroad at Wyalusing, Wisc. This plant, one of a number owned by E. C. Schroeder of McGregor, Iowa, consists of 6 standard units selected as most suitable for this railside quarry. Timber was used wherever possible to conserve metal. Output is up to the expectations of all concerned.

This plant, made up of 6 "packaged" units and arranged to provide a minimum of handling, includes: a 20″ x 36″ roller bearing primary jaw crusher of Universal's exclusive light-strong Streamlined design; a 40″ x 24″ roller bearing star gear roll crusher for secondary reduction; 4′ x 8′ three deck gyrating screen; a 36″ x 8′ apron feeder with bar grizzly and by-pass (to by-pass fines around primary crusher); a 24″ x 108′ lattice frame conveyor from primary crusher to screen; and an 18″ x 44′ channel frame return conveyor. This is another case where soundly engineered standard units of the proper size selected from Universal's complete line were brought together to form an efficient, profitable plant. Probably we can do the same for you.

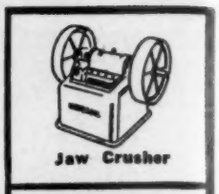
UNIVERSAL ENGINEERING CORPORATION

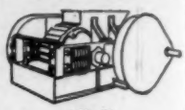
(Formerly
Universal Crusher Co.)

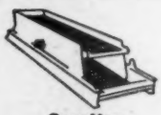
619 C Ave. West,
Cedar Rapids, Ia.

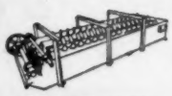
UNIVERSAL

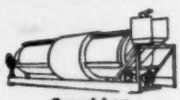
CRUSHERS, PULVERIZERS, COMPLETE PLANTS, SPREADEROLLERS, PORTABLE ASPHALT PLANTS


Jaw Crusher


Roll Crusher

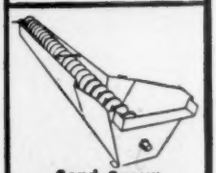

Gyrating Screen


Log Washer


Scrubber Screen

"Lattice" Conveyor

Mechanical Feeder


Sand Screw

Steel Bin

Rotovator

V-Belt Drive

Revolving Screen

Pulverizer

Bucket Elevator

Apron Feeder

Sand Tank

More Dependable POWER PER POUND WITH Sheppard Diesels

EVERY POUND . . . every inch . . . counts in the cargo holds of vessels bound for Alaska . . . Russia . . . Italy. That's one reason you find so many Sheppard Diesels "going over." They deliver more *dependable* power per pound . . . per inch. They combine compactness with the ruggedness demanded by tough overseas service.

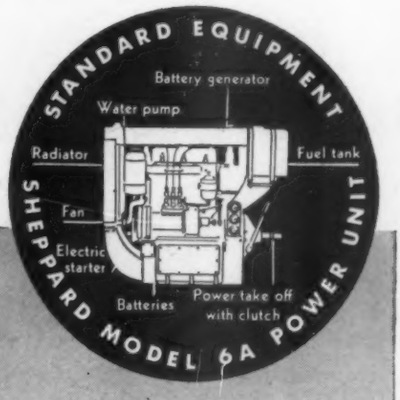
A Sheppard Diesel is a mighty big powerhouse for its size . . . whether it's used overseas or right here in America on railroads . . . in quarries . . . in mines . . . or in the oil and aviation industries. Sheppard designers and engineers pare away every surplus pound . . . every spare inch. You buy power stripped of bulk when you buy Sheppard.

Sheppard Diesels are delivered ready to run without makeshift additions. It's no trouble to put a Sheppard into operation . . . and it's no trouble to keep it in operation, either. The fuel injection system is simplified for maintenance-free performance.

It's not too soon to plan *your* future use of Sheppard Diesels.

At Sheppard, we work for the present . . . we think for the future. And we're learning constantly . . . learning to build the Diesel of tomorrow through experience gained today. Sheppard engineers are ready now to discuss your future use of Diesel power. A few Sheppard Diesel Engines are now available for essential industry on priority. Write for information and illustrated data sheet on the Sheppard Model 6A today.

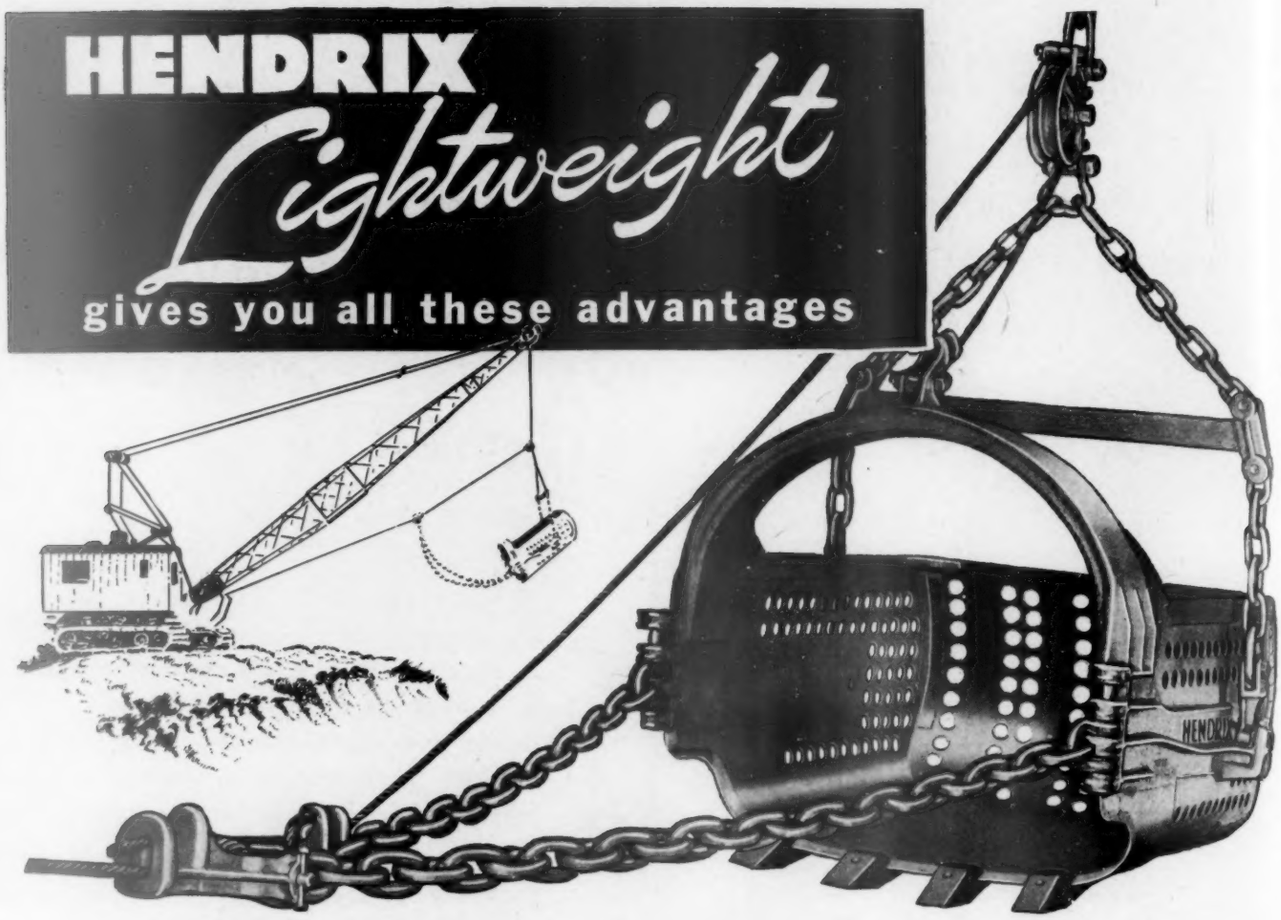
R. H. SHEPPARD COMPANY, HANOVER, PA.



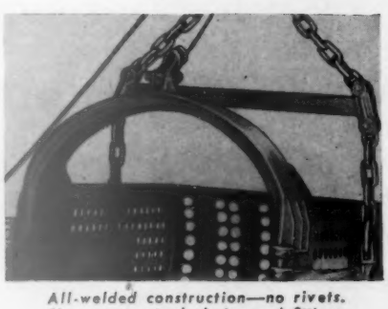
Sheppard
ALL AMERICAN DIESELS

HENDRIX *Lightweight*

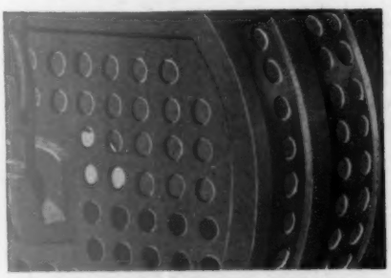
gives you all these advantages



GREATER DIGABILITY • PERFECT BALANCE
20% TO 40% LIGHTER • FULL PAYLOADS
ALL WELDED CONSTRUCTION



All-welded construction—no rivets. Manganese steel chains and fittings.



Round perforations are so arranged that overall strength of bucket is unimpaired.

Excavating contractors and dragline operators all agree that the HENDRIX Lightweight gives them years of efficient, trouble-free service. These operators have long realized increased yardage by using a larger bucket than that for which their machine was designed, yet the allowable loaded weight is never exceeded. This principle applies in either regular or long boom operations.

You, too, can step up your yardage . . . move more material and move it faster with a HENDRIX Lightweight—the one bucket, unsurpassed for dry or wet digging.

HENDRIX Lightweight Buckets are available in three types—light, medium and heavy duty—⅜ to 20 cubic yards . . . with or without perforations. All have Manganese steel chains, fittings and reversible tooth points. Write for descriptive literature—or ask your dealer.

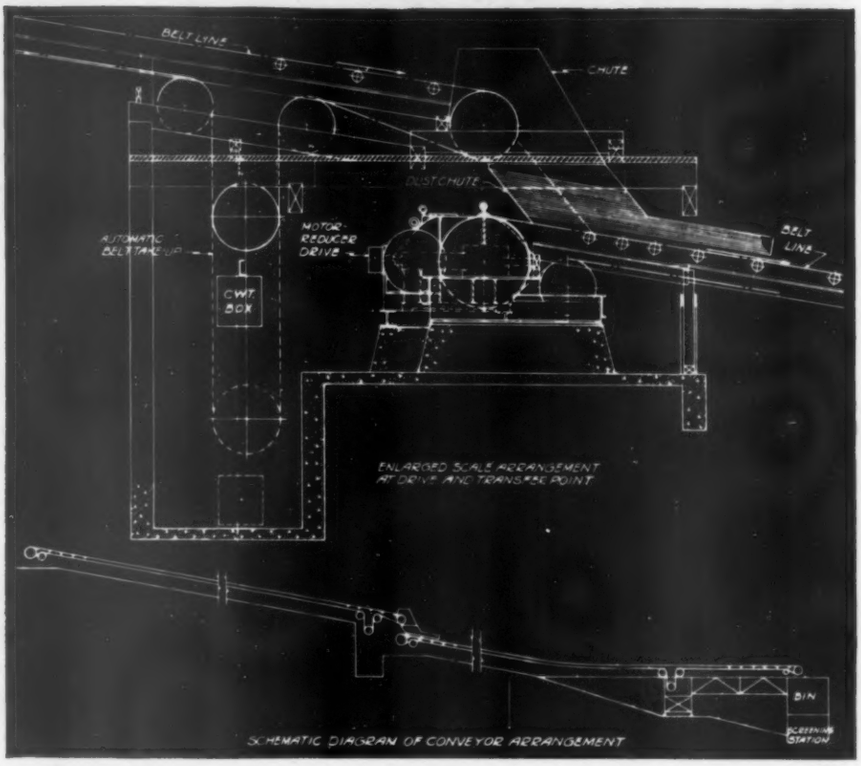
HENDRIX *Lightweight* **DRAGLINE BUCKETS**

DESOTO FOUNDRY, INC. • MANSFIELD, LOUISIANA

Reversing THE RULES OF NATURE

This Conveyor carries materials down hill in controlled capacities...despite varying densities

. . . and again Robins engineering conquers a difficult problem.



SCHEMATIC DIAGRAM OF CONVEYOR ARRANGEMENT

It seems that Robins is expected to make difficult problems simple. At least, the record of materials handling problems put to us might indicate this to be the fact.

One recent case was typical. A mining company told us that the ores on its property had quite a range of density—variances in the weight per cubic foot ran as high as 30% between the lightest and the heaviest. There was no way of controlling the materials at the source; a run of the lightest ores might change into the heaviest suddenly and without warning.

The company wanted us to design a Belt Conveyor system that would carry these ores down hill at a specified tonnage per hour, regardless of the weight per cf of the material at any one moment. It had to be done without overloading the Belt—and without losing control of the ores due to gravitational pull.

It was done. The Belt Conveyor system is quite elaborate, six of the Conveyors being 1000 feet or more in length. The entire project was designed by Robins engineers, manufactured in the Robins plant. Your Conveyor problem may be simpler—or even more complex. Regardless of its difficulties, regardless of its size, you will get eminently more mental satisfaction and productive efficiency if you turn the matter over to Robins. For Robins originated the method of conveying with a rubber belt, originated the troughing of belts—originated many other materials handling methods and machines in common use today. Isn't it logical that the company with the longest experience should know most about how to do these things best?

Whatever your needs in Belt Conveyors—or other materials handling machinery—get in touch with Robins. A Field Engineer from the nearest of our ten offices will be glad to consult with you—free of cost or obligation. Please address your letter to Dept. PQ-5.

ENGINEERS • MANUFACTURERS • ERECTORS

ROBINS CONVEYORS
INCORPORATED
Founded in 1896 as Robins Conveying Belt Co.
PASSAIC • NEW JERSEY

MATERIALS HANDLING MACHINERY

ROBINS *makes:* BELT CONVEYORS • COAL AND ORE BRIDGES • BUCKET ELEVATORS • CAR AND BARGE HAULS • CAR DUMPERS • CAR RETARDERS • CASTINGS • CHUTES • CONVEYOR IDLERS AND PULLEYS • CRUSHERS • FEEDERS • FOUNDRY SHAKEOUTS • GATES • GEARS • GRAB BUCKETS • PIVOTED BUCKET CONVEYORS • VIBRATING SCREENS • SCREEN CLOTH • SELF-UNLOADING BOAT MECHANISMS • SKIP HOISTS • STORAGE AND RECLAIMING MACHINES AND SYSTEMS • TAKEUPS • LOADING AND UNLOADING TOWERS • TRIPPERS • WEIGH LARRIES • WINCHES • WINDLASSES

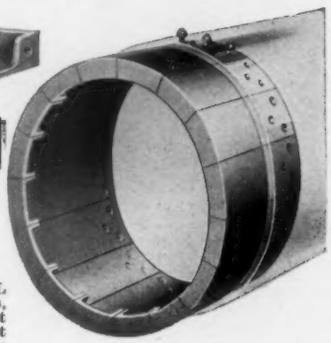
FOR MATERIAL AID IN MATERIALS HANDLING . . . . . It's **ROBINS**

Specify These Alloys for Super-Service

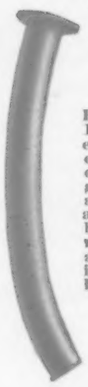
PYRASTEEL
for high temperatures

EVANSTEEL
for hard service

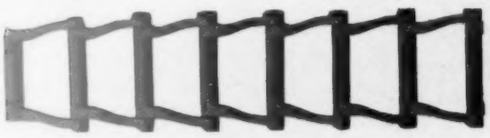
PYRASTEEL Kiln Ends are used by a majority of cement producers to reduce heat losses and improve kiln operation. They render tight sealing possible and result in substantial fuel savings. Segmental construction . . . easy to install . . . extremely durable.



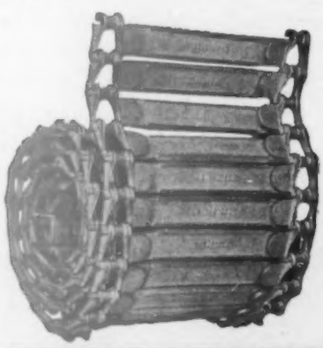
Unit segments are easy to install or replace.



PYRASTEEL Feed Pipes, either straight or curved, not only have great resistance to heat and oxidation but also high resistance to abrasion. Once installed they last for years.



Many industries, particularly cement, using rotary kilns, find that PYRASTEEL drag chains, even when they work entirely immersed in molten clinker, will stand the hardest kind of service. They do not warp, break or oxidize.



PYRASTEEL Conveyor Belts are furnished in a full range of styles and sizes for every purpose. Strongly and accurately made for high temperature applications.

During recent years, hammer mill manufacturers have been searching for a better material for pulverizing hammers. EVANSTEEL has proved to be the answer to utmost requirements.

EVANSTEEL heat-treated Pug Mill Knives show unusual resistance to wear, yet are not brittle. They do not break in service like some materials, but wear down evenly to the stub.

For clinker cooler work, PYRASTEEL has never yet failed in any application up to 2000° Fahr. PYRASTEEL is used on all makes and for any method of cooling.

For use with hot or cold clinker, EVANSTEEL Conveyor Buckets do not cost more than fabricated buckets, but their wearability is a matter of years instead of months.

EVANSTEEL heat treated Screen Plates are accurately made. They fit into position without machining and will last indefinitely.

EVANSTEEL Wire Rope Sockets have been used for 30 years without the record of a single failure. They have proved to be the strongest type of sockets on the market.

CHICAGO STEEL FOUNDRY COMPANY

Makers of Alloy Steel for Thirty Years

Kedzie Avenue at 37th Street — CHICAGO 32, ILLINOIS

ANOTHER REPEAT ORDER
FROM THE CEMENT INDUSTRY

EXPERIENCE OF MEXICAN CEMENT MILL IS TYPICAL OF THAT OF MANY SATISFIED CONE USERS

3 foot Short Head Cone and 42" x 12' Symons Screen.

3 foot Short Head and 4 foot Standard Cones and 42" x 12' Screen.

In 1941, Cementos Mexicanos, S. A., the largest and most progressive cement mill in Northern Mexico, installed a 3 foot Short Head Cone and a 42" x 12' Symons Screen ahead of their two raw grinding units; one a 6' x 24' mill, the other a 7' x 6' x 26' mill, both of the two compartment type. Prior to the installation of the Symons Short Head crusher, feed to these mills averaged 1¼ to 1½ inch in size. The resultant finer mill feed, all minus ⅜ inch produced by the Symons Short Head Cone operating in closed circuit, greatly increased the output of these raw grinding mills without increase in power consumption. After two years operation and based on careful check of capacity, power consumption and maintenance costs, a duplicate Short Head Cone and Screen were ordered in 1943 for their expanded operations. With a positive and constant feed of minus ⅜ inch to the mills, it was possible to eliminate the large grinding balls with an appreciable reduction in grinding mill maintenance costs.

• In addition to the two Short Head Cones installed in the raw grinding section, a four foot Standard Cone crusher is also being installed for preliminary crushing operations. • That so many users of Symons equipment place repeat orders is evidence of the satisfactory performance given by these crushers and screens.

NORDBERG MFG. CO.
MILWAUKEE 7, WISCONSIN
NEW YORK · LOS ANGELES · LONDON · TORONTO

SYMONS } CRUSHERS SCREENS

For better Blasting

IT'S SOMETHING TO REMEMBER — EVERY DAY

Primacord consists of a continuous core of PETN within a flexible textile cover. Primacord is insensitive to fire, friction or ordinary shock, but must be detonated by means of a fuse and cap or electric blasting cap. This detonating wave moves at the rate of 20,350 feet per *second* — practically instantaneously. It acts directly upon every cartridge in the hole, giving to each the added force of a primer cartridge.

Send for the Primacord Book — it shows the way to better (and more profitable) blasting.

11

PRIMACORD-BICKFORD

Detonating Fuse

Manufacturers of Safety Fuse since 1836

THE ENSIGN-BICKFORD COMPANY • SIMSBURY, CONNECTICUT

Pioneer can deliver

ESSENTIAL CIVILIAN EQUIPMENT

● This is the kind of advertisement you used to read a couple of years ago when manufacturers like us solicited your business. Today, Pioneer is at your service—and soliciting your business again.

At the beginning of the War Pioneer was called upon to produce the big equipment — the large portable plants used in basic construction work. We delivered the big Pioneer plants to the Government. We've done the job assigned to us.

The completion of these war orders finds our expanded production facilities and increased personnel in a position to produce crushing, screening, and handling equipment for essential work—such as Mining, Railroad Ballast, Agricultural Limestone, Airports, Essential Highways.

You'll find us prepared to help you with your important equipment needs—ready to design layout —submit it for your consideration—and proceed with manufacture for early delivery. On plants and most units, releases and priorities are essential. On feeders and screens, only suitable priorities are needed. We, or our distributors, will help you with the necessary applications.

This is a good time to get your equipment needs under consideration—work out details. Working and planning with Pioneer involves no obligation. We're ready to set up an early meeting with you. Write today.

Pioneer
ENGINEERING WORKS

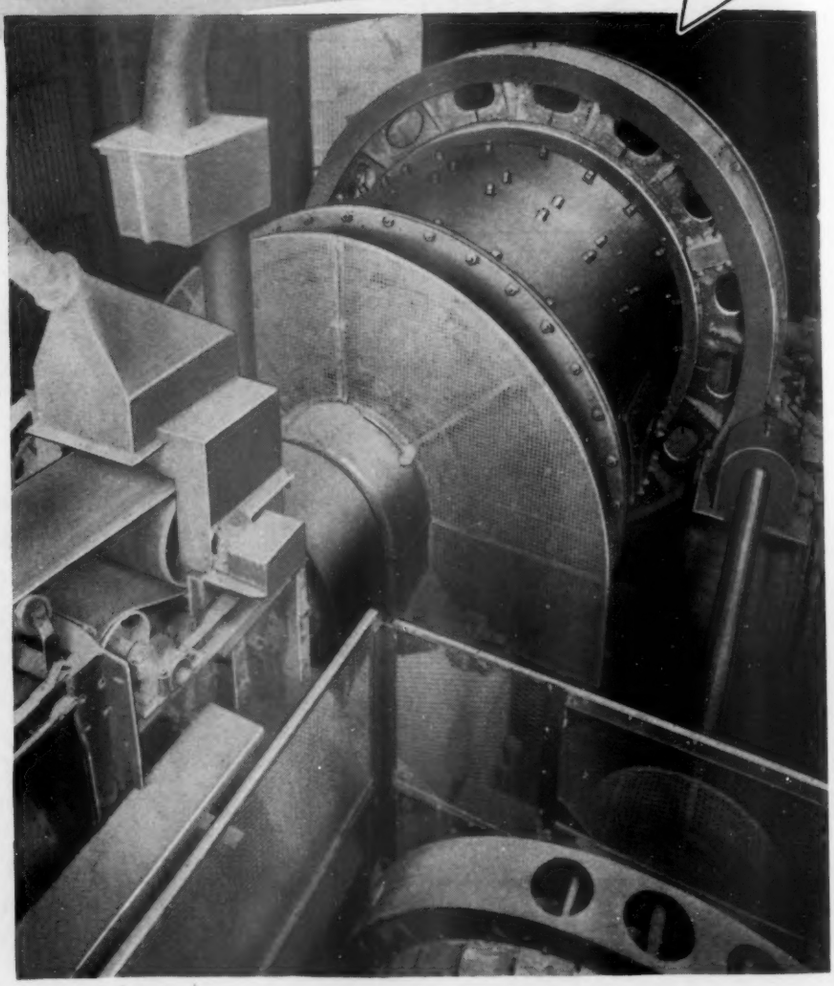
Jaw Crushers • Roll Crushers • Screens • Conveyors • Feeders • Washers

MINNEAPOLIS 13, MINNESOTA

MARCYS Grind Clinker

Faster

LOW DISCHARGE DOES THE TRICK



FOR thirty years certain advantages in design have made Marcy Mills outstanding in the grinding of metallic ores:

1. LOW DISCHARGE, made possible by Marcy's grated open end, effects quicker removal of finished material.

2. Due to quick discharge of material when finished, grinding balls work on a smaller body of material and are cushioned less — resulting in more useful work from the grinding media.

★ FOR PRIMARY GRINDING OF CEMENT CLINKER OR RAW MATERIAL, increased capacity and lower grinding cost per ton are obvious advantages.

"Mine & Smelter's" engineering staff would welcome an opportunity to discuss these factors with your consultants . . . Postwar construction MUST be a big job. Let's get ready for it.

Main Office: Denver, Colorado, U.S.A.
El Paso, Salt Lake City, 1775 Broadway, N.Y.
Canadian Vickers, Ltd., Montreal
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Genuine Wilfley Tables, Massco-McCarthy Hot Millers, Rock Bit Grinders, Belt Feeders, Automatic Density Controllers — LABORATORY EQUIPMENT, MINE & MILL SUPPLIES, COMPLETE MILLING PLANTS.

The Mine & Smelter SUPPLY CO.

+ Summing Up!

Best in

DESIGN - - - - - - - - - - - - BIG CAPACITY
MATERIALS - - - - - - - - - - HIGH PORTABILITY
WORKMANSHIP - - - - - - - - LOW OPERATING COST

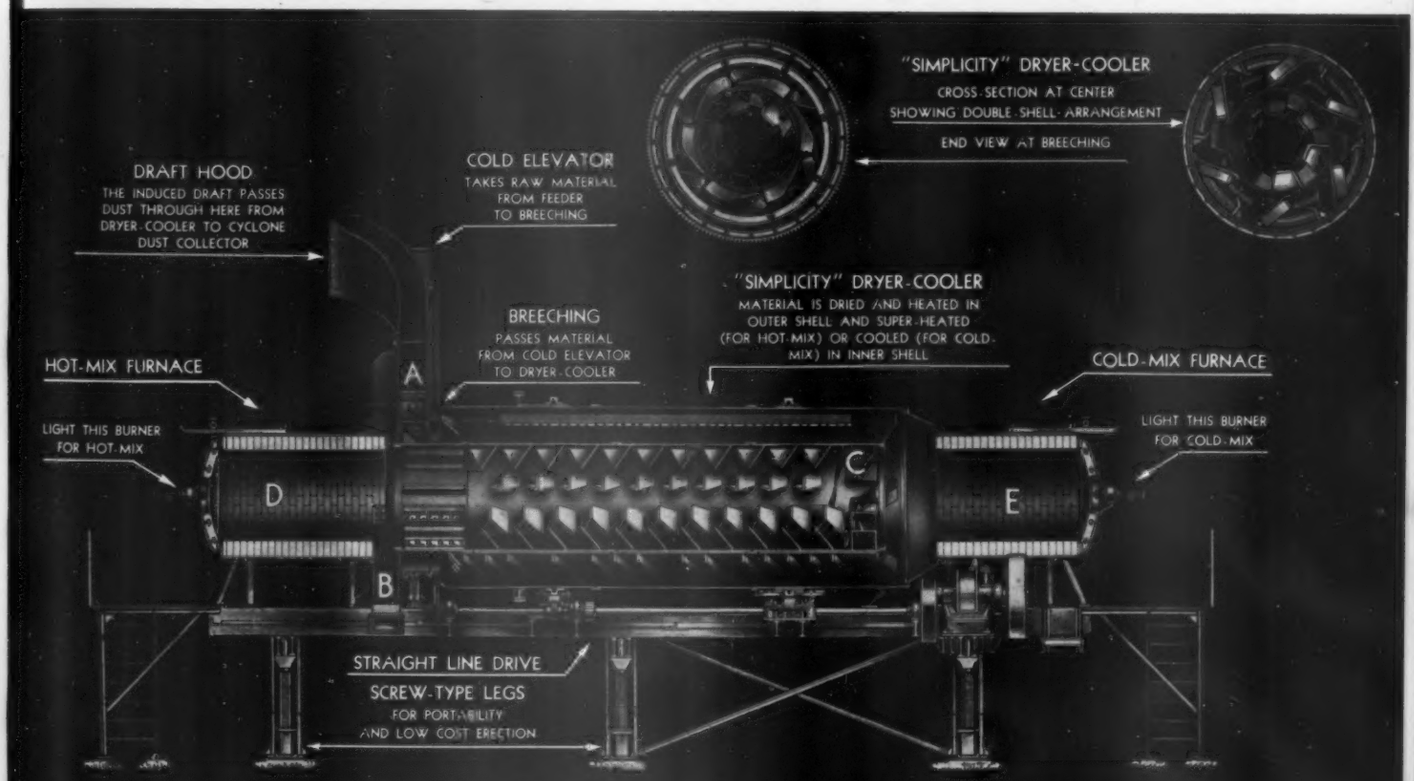
ALL ADDED UP MEANS

SIMPLICITY ASPHALT PLANTS & INDUSTRIAL DRYERS

Are

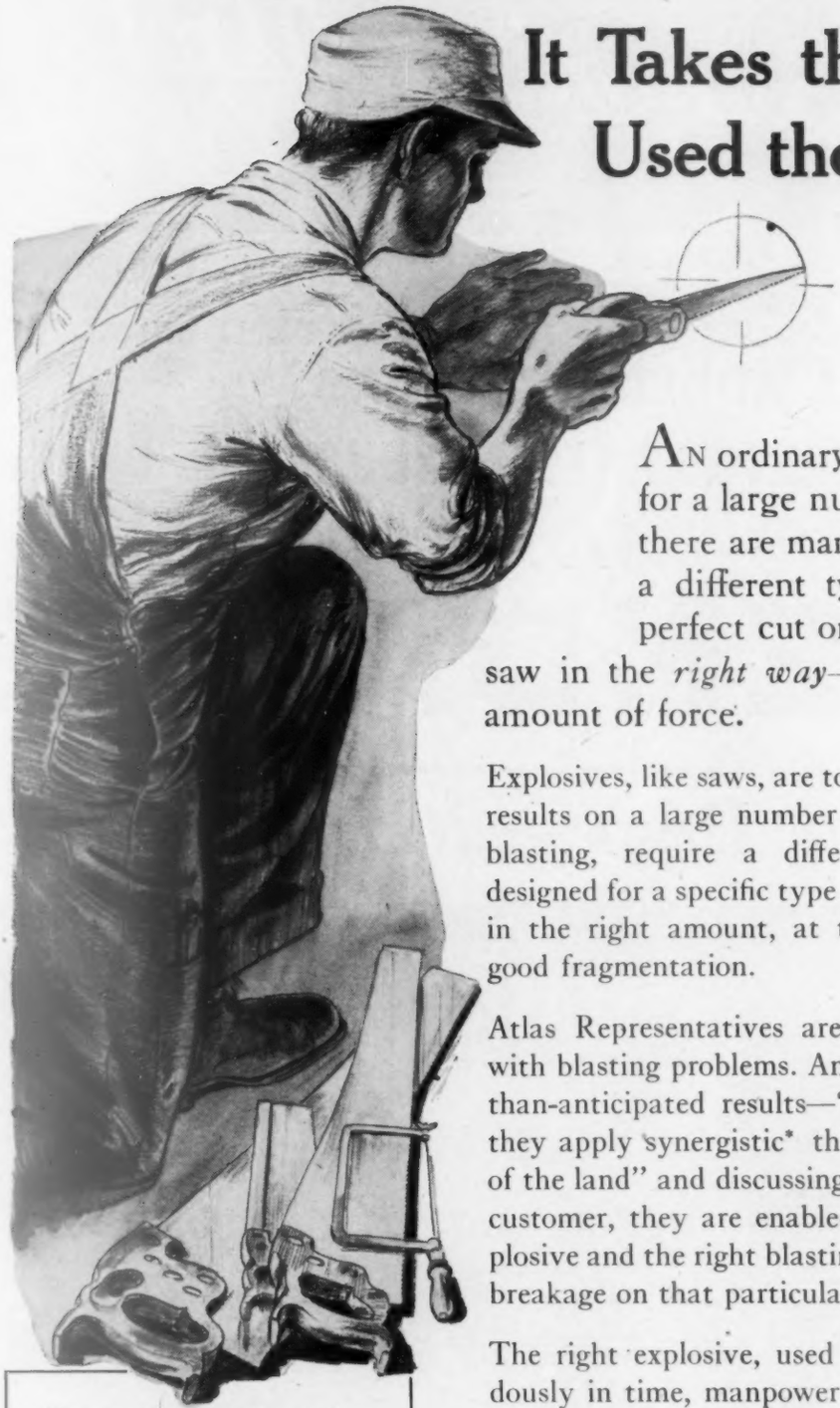
DEPENDABLE

The Simplicity Dryer and How It Works


"SIMPLICITY" DRYER-COOLER
CROSS-SECTION AT CENTER
SHOWING DOUBLE-SHELL ARRANGEMENT
END VIEW AT BREECHING
DRAFT HOOD
THE INDUCED DRAFT PASSES DUST THROUGH HERE FROM DRYER-COOLER TO CYCLONE DUST COLLECTOR
COLD ELEVATOR
TAKES RAW MATERIAL FROM FEEDER TO BREECHING
"SIMPLICITY" DRYER-COOLER
MATERIAL IS DRIED AND HEATED IN OUTER SHELL AND SUPER-HEATED (FOR HOT-MIX) OR COOLED (FOR COLD-MIX) IN INNER SHELL
BREECHING
PASSES MATERIAL FROM COLD ELEVATOR TO DRYER-COOLER
HOT-MIX FURNACE
COLD-MIX FURNACE
LIGHT THIS BURNER FOR HOT-MIX
LIGHT THIS BURNER FOR COLD-MIX
A
B
C
D
E
STRAIGHT LINE DRIVE
SCREW-TYPE LEGS
FOR PORTABILITY AND LOW COST ERECTION

"SIMPLICITY" DRYER-COOLER ASSEMBLY
LONGITUDINAL SECTION

THE SIMPLICITY SYSTEM COMPANY, CHATTANOOGA, TENNESSEE, U. S. A.



It Takes the Right Saw Used the Right Way!

AN ordinary crosscut saw can be used for a large number of sawing jobs. But there are many kinds of saws—each for a different type of job. You get the perfect cut only when you use the *right* saw in the *right way*—and apply just the right amount of force.

Explosives, like saws, are tools. Some explosives give good results on a large number of jobs. Other jobs, for good blasting, require a different explosive—an explosive designed for a specific type of shot. Use the *right* explosive in the right amount, at the right place—and you get good fragmentation.

Atlas Representatives are constantly aiding customers with blasting problems. And to give the customer better-than-anticipated results—"2 plus 2 equals 5" results—they apply synergistic* thinking. By analyzing the "lay of the land" and discussing ideas back and forth with the customer, they are enabled to recommend the right explosive and the right blasting formula for the best possible breakage on that particular job.

The right explosive, used the right way, saves tremendously in time, manpower and equipment use.

Have YOU a blasting problem you'd like us to tackle? Consult Atlas.

***Synergism:** The force that produces "2+2=5" results when both you and we get together and really "click."*

ATLAS EXPLOSIVES
"Everything for Blasting"

CHEMICALS ATLAS EXPLOSIVES

ATLAS POWDER COMPANY, Wilmington 99, Del. • Offices in principal cities • Cable Address—Atpowco

For large construction projects

TELSMITH

COMPLETE PLANTS

1,500,000 cu. yds. of aggregate for Norfork Dam.

1,500,000 tons of aggregate for Center Hill Dam.

West Mountain Plant serves many Pennsylvania projects.

1,000,000 yds. of aggregate for Delaware Aqueduct.

● When it's a big job and urgent —there's usually a Telsmith sand and gravel or rock crushing plant. A complete plant, soundly designed by Telsmith engineers—with accurately balanced Telsmith-built machinery . . . completely adequate as to crushing, screening, classifying capacity . . . fast and flexible in operation . . . entirely dependable as to product quantity, quality and sizing. For reasons *why*—get Bulletin EP-15.

MP-4

Large war projects in New England are served by this Telsmith plant.

SMITH ENGINEERING WORKS, 504 E. CAPITOL DRIVE, MILWAUKEE 12, WISCONSIN

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PIT AND QUARRY

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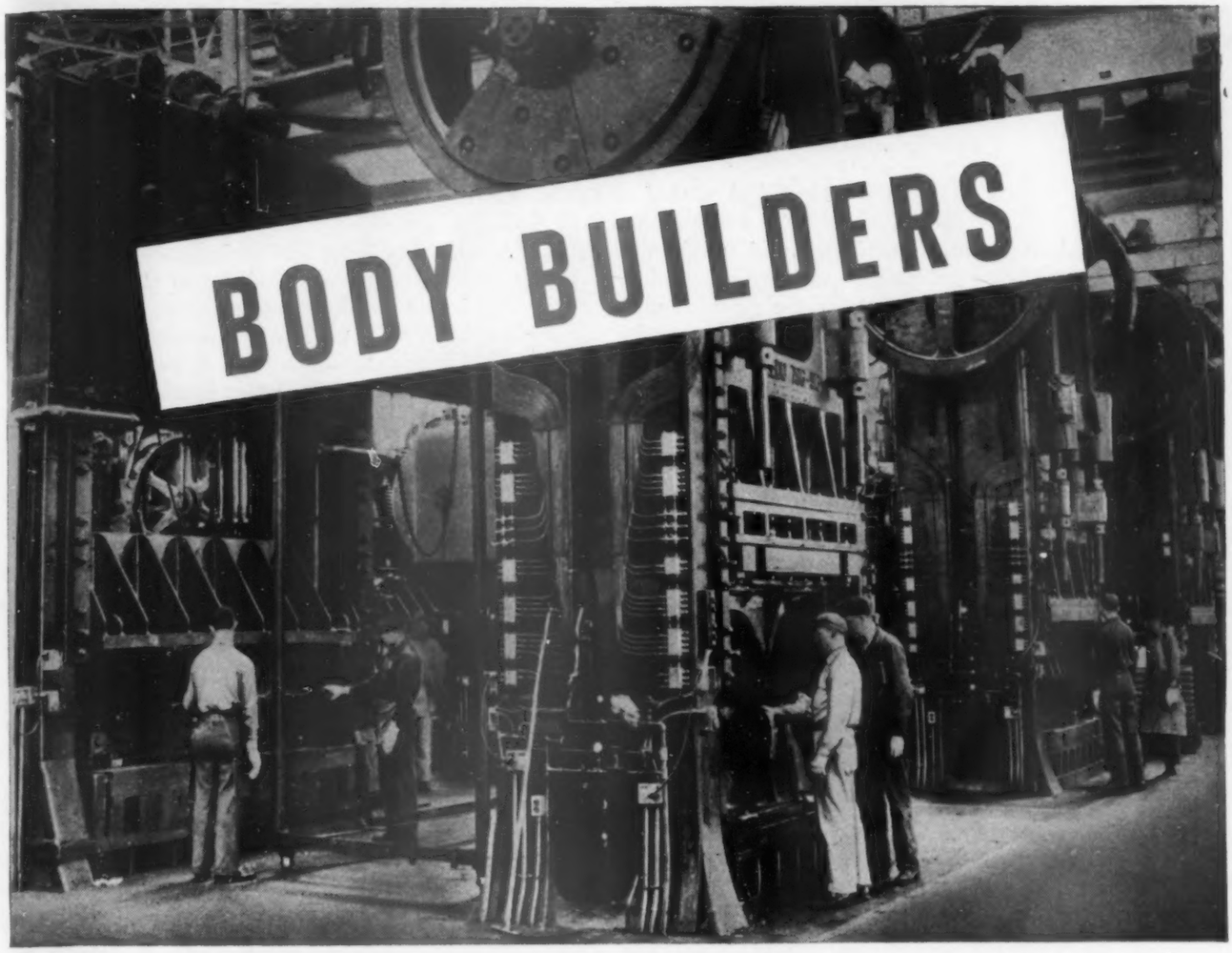

WHILE truck-bodies made on huge presses these days are mostly for military use, the civilian fleet operators will get a 1944 allotment of 88,000 vehicles, which is only a trickle compared to peacetime production. This points to the need for taking extra care of your present equipment.

Faced with this problem, fleet operators everywhere are learning from experience that they can offset much of the added wear of wartime loads and schedules by lubricating with *Texaco.*

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EDITORIAL

Wage and Price Control

THE relations between employers and employees, always a field of great difficulty for both, is no less a source of bitterness because of the government's economic-stabilization program. As long as the problems that arise in this area are open to free discussion by both sides there is the feeling that something in the direction of a settlement can be achieved. Higher wages and salaries, working conditions, seniority, paid vacations and all the other controversial factors in the situation are felt to be amenable to common understanding and adjustment when there is a disposition on both sides to listen to one another's arguments and to face the facts. This faith in the ability of reasonable men to get together in the study and solution of common problems obtains whether the bargaining be done individually or collectively.

Ever since the government felt it necessary to adopt economic stabilization as a means of checking the spread of inflation, there has been a growing mistrust, particularly on the part of workers, of the spirit of fairness shown in the granting or denying of pleas for wage and salary increases. The period through which we are passing is unique, if for no other reason, in that it is the first time in the history of labor relations that employers as a class are ready and willing to increase the earnings of their workers. In most businesses men are working harder, often during longer hours without any compensating overtime income, and in many cases exposing themselves to greater hazards because of performing work that is new to them or because of decreased watchfulness and alertness due to insufficient rest. These conditions are matters of common knowledge, common to large segments of the general public as well as to employers and employees. All parties feel that the exceptional conditions justify exceptional treatment.

It is unfortunate that the plan to stabilize prices, especially those that are factors in the average man's cost-of-living burden, coincident with the stabilization of wages and salaries has not been carried out with the same literalness and harshness that has characterized the freezing of individual earnings. Despite the fact that the stabilization program provides opportunities for correcting maladjustments within certain rather tightly drawn limits, it is common experience that relief in the direction of wage increases is much more difficult of attainment than is that in the field of price control. As a result, men's earnings have not kept pace with increasing prices and discontent grows and breaks out in strikes and threats of strikes and in other ways that distress both employers and employees, while, in some cases, impeding the nation's war effort.

The unprecedented earnings of some workers in war plants are often cited as evidence that they have not only kept pace with increases in the cost of living but have actually run ahead of them, so that the "average" worker is said to be better off under present conditions that he was before the war. It is not the purpose of the economic-stabilization program that any individual or any group should be given the means of improving his or its economic status during the prosecution of the war. Legislation has placed heavy burdens on business, removing by taxation approximately that portion of profits that are believed to be due to the war economy. It has laid its hand also on individual earnings in a determination to keep net incomes near the subsistence level as a means of checking inflation. Public sympathy does not warm toward the war-time profiteer, be he worker or corporation.

It is no more fair or realistic to cite the enormous profits of some corporations as proof of the charge that business generally is taking too much gain out of the present period. There are many businesses in which present profits are high, perhaps too high, but there are many more businesses in which the profits are not much if any above those of peace time and some in which losses have taken the place of the profits formerly earned.

Both employers and employees are made to appear guilty of taking improper shares of the national income by those on both sides who are so little concerned with truth that they readily proclaim as common practice the taking of gains, either in profits or wages, that are being made only by small minorities. Until there is greater willingness to confine such allegations to the small groups to which the facts correctly apply we can not expect much improvement in the relations between employers and employees, whose ability to adjust their genuine differences is greatly hampered, if not indeed temporarily destroyed, by the exchange of groundless accusations about excessive earnings.

UNFORTUNATELY the great majority of the decisions of the National War Labor Board, which is charged with the responsibility of judging the reasonableness and legality of applications for wage and salary increases affecting most workers, have been denials, and this fact has contributed to the growing mistrust of its purposes and attitude on the part of those adversely affected by those rulings. The fact that the employers applying for permission to make upward adjustments have in many cases initiated the action voluntarily is of little effect in offsetting the ill will engendered by a labor-board denial.

Many business men as well as workers would be glad to see evidence of a greater realism on the part of the National War Labor Board in its consideration of petitions for wage and salary relief in justifiable cases, as well as greater strictness and breadth in the application of price controls in the cost-of-living field, as means for decreasing growing tensions in the area of labor relations.

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New Concern Plans to Erect Cement Plant in Mexico

A new company, to be known as Cementos del Pacifico, has been formed to build and operate a cement plant at Marmol, about 24 miles north of Mazatlan in the state of Sinaloa, Mexico. Planned for an initial productive capacity of 900 barrels per day, the plant will supply cement for public works projects in and around the state of Sinaloa, many of them directly connected with the defense program.

The plant, which will be of the dry-process type, will have one kiln 8 feet by 150 feet, and will generate its own power. It will be located on the Southern Pacific of Mexico Railroad, about 2½ miles from the quarries.

The equipment, most of which is now on the plant site, was purchased through the Webber Equipment Company of New York City. The Macdonald Engineering Company of Chicago has the contract for construction, and it is anticipated that the work will be completed by the end of the year.

Ramon Salcido, formerly managing director of Compania Mexicana de Cemento Portland Apasco, will serve as president of the new organization.

Calaveras Cement Pays Preferred Dividend

Calaveras Cement Company has declared a dividend of 75 cents a share on the 7 per cent. preferred stock, paid March 15 to holders of record March 9.

Missouri Earnings Show Sharp Drop

Net income for 1943 by Missouri Portland Cement Company amounted to $213,272, equal to 75 cents per share, as against $534,153 or $1.89 per share in 1942. Net sales declined to $4,339,163 from the $5,828,522 in the previous year. The balance sheet shows current assets of $2,817,901, including cash of $1,956,748 and treasury notes of $200,481, while current liabilities amount to $237,370.

Import Policy Cripples Domestic Mica Industry

The Senate's Truman committee, carrying on its investigation of war production, has reported that innumerable mica mines in the United States have been forced to close because of the government policy favoring imports from Brazil and India.

The committee recommended that the controlling government agencies "eliminate discriminatory practices," take steps to encourage domestic production by relaxing specification rules, increase activities particularly in New England and step up dollar payments to miners.

Coming Events

May 16-18, 1944 — Hot Springs, Virginia. Open board meeting, National Lime Association, The Homestead.

June 8-9, 1944 — Hot Springs, Virginia. Annual meeting, National Industrial Sand Association, The Homestead.

June 19-22, 1944 — Pittsburgh. Semi-annual meeting, American Society of Mechanical Engineers.

June 26-30, 1944 — New York. Annual meeting, American Society for Testing Materials, Waldorf-Astoria Hotel.

Ohio Court Rules Gravel Equipment Exempt from Tax

In a recent unanimous decision reversing the Board of Tax Appeals, the Supreme Court of Ohio has ruled that purchases of equipment and supplies to be used in the production for commercial sale of sand and gravel from natural deposits are exempt from the Ohio sales and use taxes. The decision held that the production of sand and gravel constitutes "mining" within the meaning of the statute under consideration, rather than mere "processing," as contended by the Board of Tax Appeals.

The long-awaited decision terminates four years of controversy between the Ohio Sand and Gravel Association and the Department of Taxation regarding the assessment of sales tax on equipment purchased for use in excavating sand and gravel. Appellants in the suit were F. H. Bailey and Sons, operators of a sand-and-gravel plant at Kenton, Ohio. In reversing the decision of the Board of Tax Appeals the court entered judgment in favor of the appellants.

Massachusetts Plant Suffers Fire Damage

Damage estimated at $100,000 resulted when fire broke out in the buildings of the Old Colony Crushed Stone Company at Quincy, Massachusetts. The main building of the plant was entirely destroyed and two smaller structures were partly burned.

Shut down since January 16 for its annual repair program, the Northwestern States Portland Cement Company's plant at Mason City, Iowa, is reported to have resumed operations.

McNulty, Prominent Lime Figure, Dies After Brief Illness

Bernard L. McNulty, for almost 25 years president of the Marblehead Lime Company, died March 3 at his home in Chicago. He had been ill for several days but his condition was not regarded as critical. He was 59 years old.

Mr. McNulty was well known in Hannibal, Missouri, where he became interested in the Marblehead company. In October, 1922, he became its president. He went to Hannibal several times a year from the general office in Chicago.

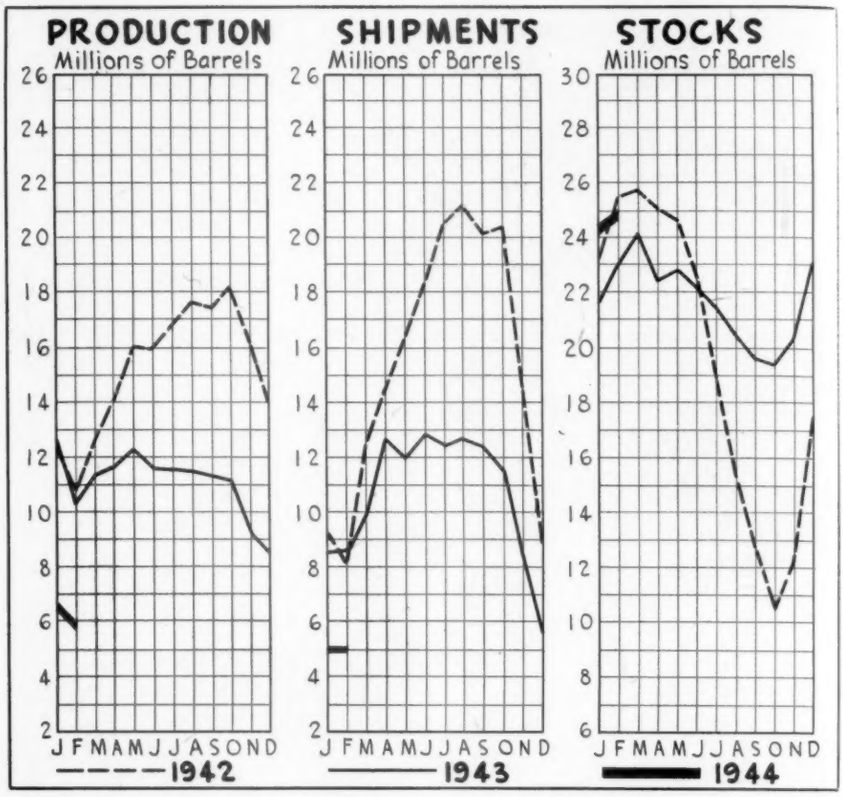
He had spent his entire active business life in the lime industry. Before taking over the Marblehead presidency he was general manager of the Lehigh Lime Company for a number of years. He had been recognized as one of the leading figures

Bernard L. McNulty

in the lime industry in the United States. For a number of years he served on the board of directors of the National Lime Association, and from July, 1929, to June, 1934, he was chairman of the board.

Besides his business Mr. McNulty had a variety of interests and was prominent in several activities in Chicago. For several years he had been a trustee of the Armour Research Foundation and the Illinois Institute of Technology in which he was greatly interested and while he was one of its trustees the institution became one of the most important of its kind in the nation.

He is survived by his widow, Mrs. Elizabeth S. McNulty, and three daughters, Mrs. John W. McNair, Baltimore, Mrs. Frank N. Bell, Wilmette, Illinois, and Mrs. Frank S. Read, Lake Forest, Illinois.



The Portland-cement industry in February, 1944, produced 5,686,000 barrels, shipped 5,055,000 barrels, and had in stock at the end of the month, 25,059,000 barrels of cement, according to the Bureau of Mines. Only 29 per cent. of production capacity was utilized during the month compared with 54 per cent. in February, 1943.

New Quarry Company in Southern Indiana

George Mattox, Inc., of New Albany, Indiana, whose agent is George Mattox, 2122 Spring street, New Albany, filed articles of incorporation with the Indiana Secretary of State at Indianapolis recently.

The concern has 100 shares of no par value and will engage in operating stone quarries and do contract hauling.

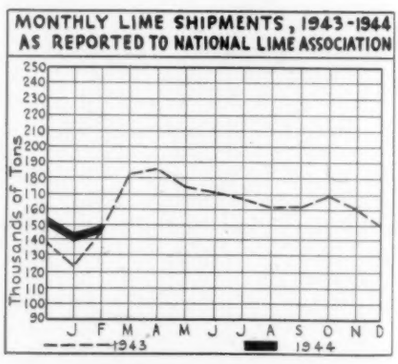
K. C. Crushed Stone Pays on Preferred

Kansas City Crushed Stone Company has reported that their net income for 1943, after depreciation and taxes, totaled $28,864. The directors of the company have ordered a dividend of $1 a share on the preferred stock.

American Potash Will Raise Lithium Output

Work has been started on a $125,000 addition to the plant of the American Potash & Chemical Corporation at Trona, California, for the purpose of further increasing production of war-vital lithium concentrate.

Also under way is construction of a $100,000 addition to the technical boric acid plant, which includes installation of a new reaction tank and a centrifugal drier.



According to data collected by the National Lime Association, 59 companies in February, 1944, shipped 149,044 tons of lime (102,073 quicklime; 46,838 hydrate). Reporting companies represent 42.9 per cent. of the association's total capacity of record. Based on PIT AND QUARRY'S estimates for the remainder of the industry, the total shipments for the month by all plants were approximately 375,000 tons. Shipments of lime by users for February, 1944, were:

Use	Quicklime (tons)	Hydrate (tons)
Agricultural	2,152	13,366
Building	6,726	12,209
Chemical	93,295	21,263
Total	102,073	46,838

Chemical and Farm Uses Gain as Lime Output Sets Record

Sales of lime in 1943 advanced to a new record volume of 6,394,000 short tons, or 5 per cent. over the 1942 sales, according to preliminary figures released by the Bureau of Mines.

The new record resulted from the increased demand for agricultural and chemical lime and dead-burned dolomite which more than compensated for a sharp decline in demand for building lime. Sales of both quick- and hydrated lime were larger than in 1942 in each of the major uses except for building purposes in which the tonnage of each type sold was markedly lower. In 1943, quicklime represented 79 per cent. and hydrated lime 21 per cent. of total sales. The second year of war affected further changes in the distribution of sales by uses, and chemical lime represented 64 per cent., dead-burned dolomite 19 per cent., building lime 9 per cent., and agricultural lime 8 per cent. of the total sales compared with the corresponding percentage distribution in 1942 of 62, 20, 11, and 7 respectively.

Ceiling prices on lime were continued through the year and only a few minor upward revisions were reported. A severe labor shortage plagued most lime operators throughout 1943. Despite the record demand, a number of plants ceased operations during the year owing to labor, price, or other reasons directly attributable to the war. However, several Portland-cement plants favorably situated with regard to lime-consuming industries were partially converted to calcining lime during 1943.

The tonnage of chemical lime sold during 1943 advanced to 4,075,000 short tons, a gain of 8 per cent. over the former record annual quantity sold in 1942. The increased demand reflects principally the greater activity in production of steel, glass, calcium carbide, and Bayer alumina, of which all showed appreciable gains in 1943 over 1942. Demand for lime for water purification probably rose slightly over 1942 as a continuation of the uptrend in sales for this use in recent years. In other industries that are major consumers of lime—insecticides, paper mills and tanneries—demand probably was lower than in 1942 owing to the decreased activity. It is probable, also, that many of the industries with relatively small annual requirements of lime consumed smaller quantities in 1943 than in 1942 because of war conditions.

Sales of dead-burned dolomite in 1943 gained only 2 per cent. over the 1942 tonnage; a relatively small increase compared with the larger output of steel in 1943.

Continued war restrictions on construction and the types of materials required in most wartime building adversely affected the markets for building lime, and sales in 1943 fell to 579,000 tons, a quantity 17 per cent. below the 1942 tonnage and nearly at the low level reached during 1933-34. Conservation Order L-41 of War Production Board was amended several times during the year, and the form of November 1 appeared to be more restrictive in total effect on construction than the prior ones. No relief from the war controls on building was in sight at the end of 1943.

Total sales of 488,000 tons of agricultural lime in 1943 were 22 per cent. larger than the 1942 volume and represented the highest annual quantity since 1917. The gain over 1942 compares favorably with the 24-per cent. increase reported in cash income from farm marketings which in 1943 was the largest ever recorded.

New Gravel Company Organized at Moline

Incorporation papers have been issued by the secretary of state to the Sheridan Gravel Company, 314 Fifteenth Street, Moline. Officers are listed as Oscar W. Ellis, H. B. Smith and L. E. Greim. It is stated the new corporation is an operating company formed to produce gravel from pits in LaSalle county, Illinois.

Mississippi Farms to Benefit from State Liming Plan

The growing importance of agriculture in winning this war and the ensuing peace has focused attention on every possible means of increasing the productivity of the land now under cultivation. This has been especially true of the production of agricultural limestone. New plants have sprung up, existing plants have been enlarged, and many crushed-stone, lime and even cement producers have installed equipment for its production. In the state of Mississippi, however, no commercial production of this vital material existed in spite of the need for it and no commercial producers appeared willing to venture into this field. As a result AAA officials urged state officials to produce agstone in order to make it available to farmers and to convince private operators that it could be produced at a profit.

The State College of Agriculture's agronomist then tested soils all over the state and found much of them deficient in lime. Governor Thomas L. Bailey then pushed through the legislature an appropriation for $30,000 to start a lime-plant construction program. The State Lime Plant Board with Si Corley, commissioner of agriculture, as one of its members, was formed to carry out this program. Under this program a deposit was located near Brandon, Mississippi, 12 miles east of Jackson. A small experimental plant was built and this was in operation in March 1943. Plans were begun at once for a larger plant and an additional appropriation of $85,000 was passed

Members of the Mississippi Lime Plant Board were present as production started at the Brandon plant.

by the state legislature through the combined efforts of Governor Bailey and Senator Ed McIntyre of Brandon. The large plant is now in operation and is to be further improved by the installation of a drier. The second plant in the program is to be built in northeast Mississippi and will work the Selma chalk formation there. When private operators are ready to take over the Board is authorized to sell these plants to them.

Previous to this program the only liming materials available in Mississippi were imported from neighboring states and the high freight rates made their cost prohibitive. About 15,000 tons of slag and 20,000 tons of agstone had been purchased annually for this purpose. Now that the state program has been publicized there has been a flood of demands for this material which would require several plants of the size of the existing one.

The Brandon plant is working in the Vicksburg formation of limestone which has a calcium carbonate content varying from 80 to 90 per cent. Under an average of 4 feet of overburden is from 22 to 37 feet of hard and soft marl so intermingled that no single system of processing can be used. In addition to the present crushers, elevator and screen a drier will be installed to make possible a single processing of the combined materials.

The agstone produced is sold on a cost basis, plus delivery, and various communities through their county agents will buy spreaders to apply the material to the soil.

Permanente's Hawaiian Bulk Plant Active

Permanente Cement Company's Hawaiian bulk cement plant is reported to have handled in excess of 2,500,000 barrels of cement in the little more than two years it has been under Kaiser control. Recently the plant, which has been a main-stay of Hawaiian war construction, has handled 5,000 barrels a day. Cement is shipped to the plant from California in bulk.

Ohio Gravel Company Buys Miami's Plant

The Ohio Gravel Company, Cincinnati, operator of several aggregate plants in the Cincinnati area, has just purchased the Miamitown plant of the Miami Gravel Company. According to Fred W. Cornuelle, president and general manager, the acquisition of the plant was part of the Ohio Gravel Company's plan for post-war enlargement of its operations. The newly-acquired plant will be progressively improved in the future as conditions allow. Its present capacity is about 350,000 tons annually.

With the passing of the ownership of this plant, the Cincinnati Quarries Company, which has marketed the output of the plant, is going out of business. Formerly a producer, Cincinnati Quarries had for several years merely acted as sales agent in Cincinnati for the Miami Gravel Company.

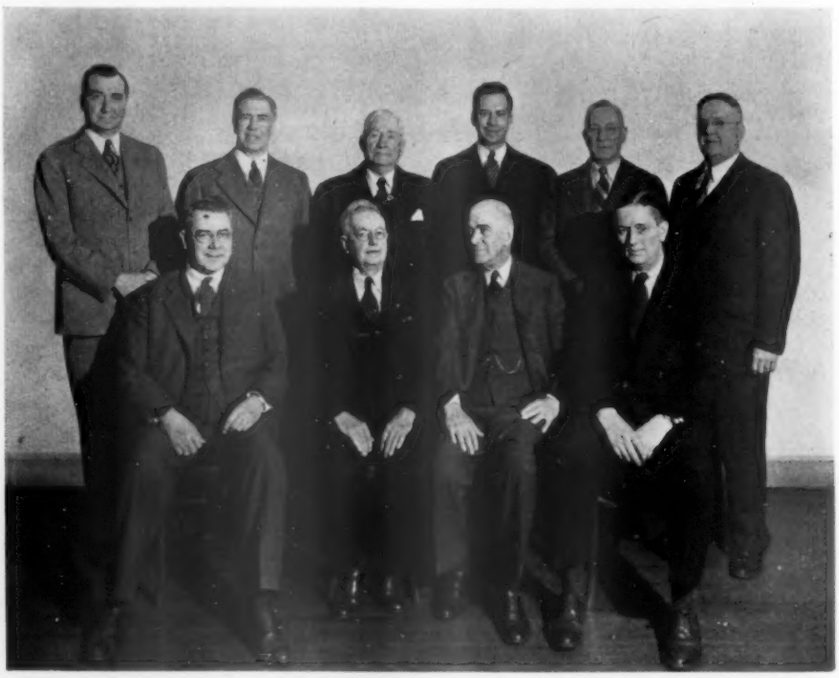
WPB Approves Idaho Superphosphate Plant

The War Production Board is reported to have approved the expenditure of $500,000 for equipment and materials to construct a superphosphate plant at Pocatello, Idaho. Phosphate rock for the plant will come from the Anaconda Copper Mining Company's plant at Conda, Idaho.

A certificate of incorporation has been filed for the Gasport Sand & Gravel Company, Incorporated, Gasport, New York. Leon H. Wendel, W. Alfred Brim and Geraldine Grimble are listed as directors.

Here's "Old Ironguts," the first shovel ever built by the General Excavator Company, of Marion, Ohio, and still in the service of the Scioto Lime & Stone Company, Delaware, Ohio. Beside the veteran shovel are operator Verne Andrew (left) and W. A. Reaney, general manager of The Scioto company. Although it has been in service for 17 years the machine is still a long way from a pension. In fact, when war came, instead of retiring, it simply stepped up its capacity and worked harder than ever, handling a ¾-cubic yard dipper although originally built as a ½-cubic yard machine.

The Lone Star Cement Company's plant at Greenport, New York, has ceased manufacturing operations temporarily while repairs are being made to machinery and plant property. It is not definitely known when operations will be resumed.



At a recent luncheon held in the Passaic City Club, William P. Newman, purchasing agent of Robins Conveyors Inc., manufacturers of materials handling machinery, was honored on the celebration of his 45th anniversary with that company. Present at the gathering were 16 people who had spent a total of 400 years with the company. Pictured above, they are left to right, standing: H. Von Thaden, vice-president (21 years); E. C. Salzman, vice-president (34 years); T. M. Keith (34 years); T. Webster Matchett (11 years); R. W. Eichenberger, vice-president (34 years); E. S. Stadelman (36 years). Left to right, seated: T. Matchett, president (31 years); W. P. Newman, purchasing agent (45 years); Thomas Robins, chairman of the board (53 years); Thomas Robins, Jr., chairman of the Executive Committee (25 years).

WASHINGTON NEWS LETTER

Reconversion Problem

another P and Q exclusive

WAITING for the anticipated invasion of the European continent has induced almost as much tension among government officials as among the public generally. This is perhaps the kindest way in which to explain the antics of the past month in the handling of some manpower and reconversion problems. By this time most people have become used to the on-again off-again pronouncements of the Selective Service Administration, but many have hoped that reconversion policies, however slow in formulation, would be clear and consistent when established.

In this respect the reconversion program is off to a poor start. At the insistence of the armed services, the War Production Board early in April directed all its industry divisions to restrict resumption of civilian goods production in labor areas classified by the War Manpower Commission as Group I or Group II. The aim of this directive, of course, was to prevent interference with war production. The most sweeping limitations, therefore, were applied to Group I localities, those designated as areas of current acute labor shortage.

Under the WPB memorandum producers located in such areas were not to be authorized to manufacture civilian items at a rate in excess of actual or authorized production (whichever was lower) during the first quarter of this year. No provision was made for any exceptions to this general rule. Group II areas are defined as those experiencing current labor stringency and anticipating a labor shortage within six months. The policy for these regions was to be the same as for Group I, with the difference that specific exceptions could be approved under unusual circumstances and even then only when it was clear that no interference with war production could "possibly" result.

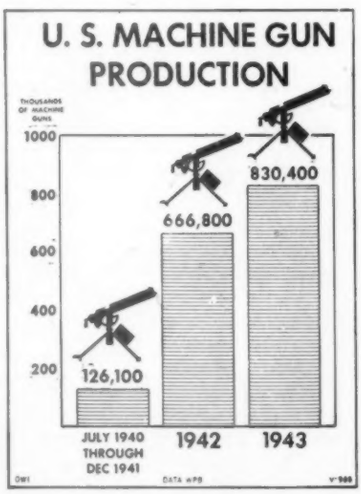
As might have been expected, a storm of protest arose in the Congress, and from the Office of Civilian Requirements and the Smaller War Plants Corporation within the WPB. The position taken by these groups is that military production, even in the critical labor areas, can be safeguarded through methods more intelligent and more economical than the blanket prohibition of possible interferences from increased civilian output.

It was indicated on this page last month that the theoretical basis of the Army-Navy position on this question is that strict limitation of civilian production can not have any adverse effect and may exert some beneficial effect upon urgent munitions production. If they could be satisfied that increased output of civilian goods would not injure the war effort, military leaders could be persuaded to alter their stand.

The prediction was also made last month that a moderate view would finally prevail, and this forecast has now been strengthened by WPB's recent announcement that the original directive to its industry divisions has been rescinded. A substitute plan will be issued shortly.

Much of this confusion might have been avoided if the special committee, set up within the WPB to reconcile varying views as to reconversion policies, had already begun to function. This group is still in its early organizational stages.

In the meantime, a measure of progress has been made in respect to other recommendations of the Baruch-Hancock report for reconversion planning. A uniform procedure for the disposal of government-owned surplus commodities held by all procurement agencies is being worked out. It has already been decided to decentralize the sales machinery as much as possible and to place wide discretionary powers for negotiation in the hands of surplus disposal officers. Some heat has been generated on the question of what to do with surplus war plants, with some groups advocating government operation of all or some of these plants under the yardstick principle.



The mechanics of contract termination settlements have also been the subject of heated debate, particularly in the Congress. Differences between the House and Senate as to the extent of the auditing authority of the Comptroller General will probably delay legislative action for some time. The House would give the Comptroller the right to make audits before contract settlements, while the Senate, following the Baruch-Hancock proposal, would confine such audits to cases where fraud is suspected.

One of the most important pieces of legislation now before the Congress is the bill extending the Price Control Act, which expires on June 30. There is no doubt whatever that an extension of at least one year will be voted, but the restrictive amendments which are being considered could seriously undermine OPA effectiveness. However OPA has grown tremendously in public esteem during the past few months, and this will probably serve to prevent the more flagrant provisions which some special interests would like to write into the act under the guise of eliminating abuses.

Georgia Firm Increases Agstone Capacity

The Willingham-Little Stone Company of Atlanta recently made improvements at one of its two plants at Whitestone, Georgia, to increase the production of agricultural limestone for which there is an unprecedented demand in the state this year, according to William M. Little, president. Included in the improvements was a new Sturtevant rock-crusher.

Will Convert Gravel Plant to Portable Unit

The board of supervisors of Iron County, Ironwood, Michigan, have appropriated the sum of $14,000 for the conversion of the county's gravel plant to a portable unit. A new Diesel engine is also to be installed.

the VICTORY *Program*

. . . . . AND YOUR BUSINESS

BULLDOZERS AND TRUCK-MIXERS.—Restrictions on the use of alloy steel in scrapers, angledozers or trailbuilders, and bulldozers were removed March 17, the War Production Board announced. Action was taken by revocation of Schedules I, III, and IV of the construction machinery and equipment simplification and conservation order (L-217). Simultaneously, WPB removed restrictions on the use of metal for specified parts of truck-mixer-agitators through an amendment to Schedule VI of the order.

This action is in line with WPB policy of permitting a return to materials normally used if the supply situation warrants the change, if no additional labor will be required, and if the change will result in a better product.

Schedule I, covering scrapers, was issued simultaneously with Order L-217 in November, 1942; Schedule III, covering angledozers or trailbuilders, and Schedule IV, covering bulldozers, were issued in January, 1943. These three schedules prohibited the use of alloy steel in manufacturing.

Schedule VI, covering truck mixer-agitators, was issued in February, 1943. It limited manufacture to specified sizes and types and also prohibited the use of metal in running board platforms or drum guards except for supporting brackets. The schedule as amended March 17 deletes the prohibition on the use of metal in these parts. Limitations on sizes and types, however, remain unchanged.

CEMENT PRICES INCREASED.—An increase not to exceed 20 cents a barrel in manufacturers' and dealers' prices for sales of cement in the Northeastern United States was announced April 15 by the Office of Price Administration.

The adjustment applies to standard Portland cement and high-early-strength cement as well as other similar types, but excludes white Portland cement, natural cement, masonry cement, and other modified types.

Effective April 20, 1944, the increase applies to sales made in Maine, Vermont, New Hampshire, Massachusetts, Rhode Island, Connecticut, New York, New Jersey; the Counties of Potter, Clinton, Center, Huntington, Franklin, and all counties located East of them in the state of Pennsylvania; Maryland, the District of Columbia, Delaware, the City of Alexandria, Virginia; and the counties of Loudoun, Arlington, Fairfax, Prince Williams and Stafford, Virginia.

Present provisions of the regulation governing manufacturers' prices for cement provide that the maximum price in the Northeastern area shall be such that the cost to the purchaser at the destination is not in excess of what it was, or would have been to such purchaser, for a delivery completed between March 1-15, 1942, adjusted only to reflect any actual change in transportation costs.

Demand for cement in that area has fluctuated with the trend of construction volume. During the pre-war period, 1936-1939, shipments by plants located in the region averaged 27,833,000 barrels a year. In 1941 and 1942 they rose to 43,555,000 and 42,716,000 barrels, respectively, while in 1943 they dropped sharply back to 26,644,000 barrels. The drop in output was accompanied by a reduction in the number of plants operating.

Remaining cement producers in the area have submitted data to OPA indicating that the decline in volume and increased production costs have resulted in such financial hardship as to threaten maintenance of production.

While the increase resulting to them may be passed on by persons and firms reselling cement without further processing, no increase may be made in present prices for manufactured products in which the cement forms a part of material costs. Necessary price adjustments for producers of the manufactured products will be handled under the applicable regulations.

The action just taken also allows manufacturers and dealers of other types of Portland cement, except white cement and masonry cements, automatically to adjust ceiling prices. The regulation, as originally issued, made provision for pricing on the basis of differentials in price from Types 1 and 2 Portland cement. White cement and masonry cements, however, are sold on a different kind of pricing structure and may not be adjusted automatically.

(Amendment No. 6 to Maximum Price Regulation No. 224—Cement—effective April 20, 1944.)

LABOR COST IN MINOR CAPITAL ADDITIONS.—Rules governing minor capital additions made under Controlled Materials Plan Regulation No. 5 have been clarified to point out specifically what labor costs may be excluded in determining the value of the addition, the Controlled Materials Plan Division of the War Production Board announced March 23.

Labor costs that may be disregarded for the purposes of the $500 limit established by the regulation are funds paid for (1) the services of the purchasers' own regular employees, (2) additional employees that are hired for doing construction or installation work, and (3) fees to independent contractors who install equipment or do construction work where, under normal business practices, the fee is paid primarily for services as distinct from materials.

To illustrate, if a purchaser of a piece of machinery costing $500 pays the seller an additional $50, which is normally a separate charge, or if he hires an independent contractor to make the installation, the $50 charge may be disregarded even though the seller or independent contractor may furnish a few minor material additions, such as wiring or pipe.

However, if a purchaser hires a building contractor to construct an addition to his plant, under circumstances where the contractor would normally charge a single fee including building materials, labor and profit, the total fee must be taken into consideration in determining whether or not the addition comes within the $500 limit. In this case the contractor's labor may not be deducted since the contractor is paid primarily for the completed addition rather than for the labor of installing property that was purchased separately. Likewise, if the seller of the capital addition usually makes a single charge, including installation, the cost of such installation must be included.

The clarification was made in Interpretation 11 to CMP Regulation No. 5.

MINING ORDER P-56 REVISED.—The P-56 order covering the mining industry was again amended on April 5. The changes from the last revision of March 3 are indicated by underscoring in the full text which appears below.

The filing of quota applications is no longer required on Form 2929 by producers holding mine serial numbers. They have a preference rating of AA-1 for the purchase of MRO items except controlled materials. By a suitable endorsement and use of the allotment symbol S-7 on their purchase orders, they may obtain controlled materials for maintenance, repairs, and operating supplies.

Any producer's purchases of MRO items shall not exceed 120 per cent. of his aggregate expenditures for such items in the corresponding calendar quarter of 1943. Also paragraph (e) (1) provides that no producer, whether with or without mine serial numbers for specific plants, is permitted to order controlled materials for delivery during any calendar quarter in an amount exceeding 120 per cent. of the "aggregate expenditures for controlled materials for use as maintenance, repair, and operating supplies during the corresponding calendar quarter of 1943."

The amended order does not alter the producer's right to continue to use the quota authorization basis if he prefers it. But if the use of the 120-per cent. basis in the second quarter of 1944 as compared with the same quarter of 1943 would give him a greater authorization, he is now permitted to avail himself of it. In that event he may defer until the third quarter of 1944 his adoption of the new system.

If a producer's separate plants maintain separate records of MRO supplies he may treat them separately in complying with the provisions of sub-paragraph (e) (1) but is not required to do so. Producers who do not have mine serial numbers for specific plants are given an AA-5 rating for MRO items. They are on the same basis as producers having serial numbers when ordering controlled materials for use as maintenance, repair and operating supplies. Their use of the allotment symbol number S-7 and the method of calculating the allowable purchases is the same as that for producers having serial numbers. If a producer finds the AA-5 rating inadequate he may apply on Form WPB-2910, filed with the Mining Division in Washington, for whatever rating the supplier demands. He may apply for priority assistance for new machinery and equipment, including minor capital additions, by filing Form WPB-1319 with the Mining Division. In sub-paragraph (b) (3) MRO includes "minor capital additions normally necessary to the operation of the enterprise, but not exceeding in cost $500 (excluding purchaser's cost of labor) for any one complete capital addition". In calculating allowable expenditures for MRO items in the second and succeeding quarters of 1944 the producer must use as his base, in applying the 120 per cent.

factor, the total of his minor capital additions in the corresponding quarter of 1943 plus his purchases of ordinary MRO items.

For the purchase of new machinery and equipment not obtainable under the minor capital additions provisions producers continue to use Form WPB-1319. The obligations of producers under Order L-192 are not affected by the amendment of P-56 in so far as the purchase of repair parts for equipment listed in Schedules A and B of that order is concerned.

In paragraph (m) producers are given means for obtaining relief from any provision which imposes on them an unreasonable burden or which, if arbitrarily applied, would prevent him from obtaining necessary supplies or equipment. When buying controlled materials producers with mine serial numbers use the following endorsement on their purchase orders:

Allotment No. ..... S-7.
Order authorized under preference rating order P-56, Serial No. .....

When buying MRO items, including minor capital additions, such producers use the following endorsement on their purchase orders:

Preference rating ..... AA-1.
Order authorized under preference rating order P-56, Serial No. .....

Producers without serial numbers use the following endorsement when buying controlled materials:

Allotment No. ..... S-7.
Order authorized under preference rating order P-56, Serial No. ..... none and when buying MRO items (but not including minor capital additions), the following endorsement:

Preference rating ..... AA-5.
Order authorized under preference rating order P-56, Serial No. ..... none, except in cases where PR3 permits the use of a P-56 rating for the purchase of a particular item.

Paragraph (g) of P-56 prohibits the use of preference ratings for MRO items listed on List A or List B of Priorities Regulation 3.

Producers desiring to sell any of their material or machinery or equipment may do so under any one of the four procedures enumerated in paragraph (i). Sales may be made to producers holding serial numbers without obtaining the approval of the Mining Division but not to producers without serial numbers unless with Mining Division approval.

The full text of P-56 as amended April 15, 1944, follows:

PART 3201—MINING

[Preference Rating Order P-56 as Amended Apr. 5, 1944]

MINES AND SMELTERS

§ 3201.11 *Preference Rating Order P-56*—(a) *Purpose and scope.* This order explains how operators of mines and smelters in the United States and in foreign countries may get the materials and products they need to carry on their operations. The materials covered include not only maintenance, repair, and operating supplies, including controlled materials, but also machinery, other kinds of materials, and equipment. This order does not apply, however, to an operator of a nonessential mine as defined in Limitation Order L-208.

(b) *Definitions.* (1) "Producer" means a person operating any of the following enterprises, whether in the United States, or any of its territories, or in a foreign country, but does not include any enterprise defined as a "nonessential" mine in Order L-208 or any like enterprise located outside the United States, its territories or possessions: (i) any plant actually engaged in the extraction by surface, open-pit, or underground methods, or in the beneficiation, concentration, or preparation for shipment of the products of mining activity; (ii) any plant wholly engaged in the processing and burning of refractories; (iii) any plant producing any material listed below by smelting or refining processes, and to whom a serial number has been issued under Preference Rating Order P-73, or is hereafter issued as provided in paragraph (c):

Antimony	Nickel
Cobalt	Platinum
Copper	Tin
Iridium	Tungsten
Lead	Vanadium
Mercury	Zinc
Molybdenum	

(iv) any prospecting enterprise for the discovery, exploration, or development of new or additional mining projects, including the construction of access roads; and (v) mines, concentrating mills, smelters, railroads, power plants, refineries, and appurtenances owned and operated by the companies holding serial numbers under Preference Rating Order P-28 on December 24, 1943.

(2) "District" means a mine supply control district of the Foreign Economic Administration.

(3) "Maintenance, repair, and operating supplies" means material used for the following purposes by producers in the conduct of enterprises described above in paragraph (b) (1): (i) minimum upkeep necessary to continue the working condition of essential property or equipment and (ii) restoration of essential property or equipment to a sound working condition after wear and tear, damage, destruction or failure of parts, or the like have made the property or equipment unfit or unsafe for service; and supplies which are essential to and consumed or worn out in the conduct of such enterprises. In addition, except as hereinafter noted, the term "maintenance repair, and operating supplies" includes minor capital additions normally necessary to the operation of the enterprise, but not exceeding in cost $500 (excluding purchaser's cost of labor) for any one complete capital addition. The term "one complete capital addition" includes a group of items customarily purchased together and all items which would normally be purchased as part of a single project or plan. No capital addition shall be subdivided for the purpose of coming within this paragraph.

Producers Holding Serial Numbers

(c) (1) *Maintenance, repair, and operating supplies for domestic producers with serial numbers.* Producers located within the United States, its territories and possessions (herein called "domestic" producers), holding serial numbers, which may be obtained in the manner specified in paragraph (f), are hereby assigned a preference rating of AA-1 for the purchase of maintenance, repair, and operating supplies, other than controlled materials. This rating may be applied by the producer by placing on his delivery order the endorsement described in paragraph (g). The producer may obtain controlled materials for maintenance, repair, and operating supplies by endorsing his delivery order with the endorsement described in paragraph (g) and inserting the allotment symbol "S-7" therein. An order bearing this endorsement constitutes an authorized controlled material order. No serialized producer shall order for delivery during any calendar quarter, with or without preference ratings or allotment number, maintenance, repair, or operating supplies in an aggregate amount exceeding 120 per cent of his aggregate expenditures for maintenance, repair, and operating supplies during the corresponding calendar quarter of 1943. A producer who has several plants or other operating units which maintain separate records of maintenance, repair, and operating supplies may treat each of them separately for purposes of complying with the provisions of this paragraph (c) (1).

(2) *Maintenance, repair, and operating supplies for foreign producers with serial numbers.* Producers located outside the United States, its territories and possessions and outside of Canada,[1] (herein called "foreign" producers), holding serial numbers, which may be obtained in the manner specified in paragraph (f), may apply for priorities assistance for maintenance, repair, and operating supplies by filing the foreign mine quota application Form WPB-2937 with the Mining Division, War Production Board, Washington 25, D. C.

(3) *Machinery and equipment.* Domestic producers, foreign producers, and Canadian producers holding serial numbers may apply for priorities assistance in obtaining machinery or equipment by filing Form WPB-1319 in accordance with WPB-1319 instruction manual. If necessary, Form WPB-1319 may be accompanied by a letter giving any unusual relevant circumstances. No specific application is necessary in the case of minor capital additions as defined in paragraph (b) (3) unless a special form is required by another order of the War Production Board.

[1]Producers located in Canada, whether or not they hold serial numbers issued under this order, may obtain maintenance, repair, and operating supplies in the United States under Canadian order PO5B.

Foreign Producers Operating Under Mine Supply Control Districts

(d) *Priorities assistance for certain foreign producers operating under mine supply control districts.* To enable a producer not holding a serial number hereunder and located outside the continental United States and within the jurisdiction of a district to obtain priorities assistance, the following procedure is established:

(1) For maintenance, repair, and operating supplies a district may apply for priorities assistance by filing the foreign mine quota application Form WPB-2937 with the Mining Division, War Production Board, Washington 25, D. C. A producer not holding a serial number and located in a district may apply for priorities assistance by submitting to such district his purchase orders for maintenance, repair, or operating supplies, together with such information as may be required by the district. Within the limits of the priorities assistance granted to it pursuant to this paragraph (d) (1), such district may authenticate any such purchase order for maintenance, repair, or operating supplies by indicating the appropriate priorities assistance and countersigning the purchase order as follows:

Approved:

.....
Name of district

.....
Signature of authorized official

(2) For other machinery, materials, and equipment, a producer not holding a serial number and located within a district may submit to the War Production Board, Form WPB-1319, such application to be endorsed with the signed approval of the district within which the applicant is located.

(3) A distributor of maintenance, repair, or operating supplies or of other machinery, materials, or equipment used by producers, who is located outside the United States and within the jurisdiction of a district, may apply for priorities assistance in the same manner as prescribed in paragraphs (d) (1) and (d) (2) for producers not holding serial numbers and located within the jurisdiction of a district.

Other Producers Not Holding Serial Numbers

(e) (1) *Priorities assistance for other producers not holding serial numbers.* A preference rating of AA-5 is hereby assigned to delivery orders for maintenance, repair, and operating supplies (including minor capital additions as defined in paragraph (b) (3)), other than controlled materials, placed by domestic producers not holding serial numbers (other than operators of nonessential mines as defined in Limitation Order L-208). This rating may be applied by the producer by placing on his delivery order the endorsement described in paragraph (g). The producer may obtain controlled materials for maintenance, repair, and operating supplies by placing on his delivery order the endorsement described in paragraph (g) and inserting the allotment symbol "S-7" therein. An order bearing this endorsement constitutes an authorized controlled material order. No producer who uses the allotment symbol assigned by this order shall order controlled materials for delivery during any calendar quarter in an amount exceeding 120 per cent. of his aggregate expenditures for controlled materials for use as maintenance, repair, and operating supplies during the corresponding calendar quarter of 1943. Such producers may apply for higher ratings for maintenance, repair, or operating supplies exclusive of minor capital additions by filing Form WPB-2910 with the Mining Division of the War Production Board, Washington 25, D. C. Such producers may apply for priorities assistance for machinery or equipment and minor capital additions by filing Form WPB-1319 with the Mining Division of the War Production Board, Washington 25, D. C. Foreign producers, not holding serial numbers and not located in a mine supply control district, may apply for priorities assistance for maintenance, repair, and operating supplies, exclusive of minor capital additions, by filing Form WPB-

2910 with the Mining Division of the War Production Board, Washington 25, D. C., and for machinery or equipment, including minor capital additions, by filing Form WPB-1319 with the Mining Division of the War Production Board, Washington 25, D. C.

(2) [Deleted April 5, 1944.]

Serial Numbers

(f) *Issuance of serial numbers.* Applications for serial numbers may, in the case of producers within the continental limits of the United States, be filed with the appropriate War Production Board Regional Office, Attention: Regional Technical Advisor, Mining Division; or with the appropriate State Coordinator of Mines for transmission to such Regional Advisor; or with the Mining Division, War Production Board, Washington, D. C. Serial number application by districts must be filed with the Mining Division, War Production Board, Washington 25, D. C. Applications by Canadian and all other foreign producers should also be filed with the Mining Division, War Production Board, Washington 25, D. C. In filing such application, the following forms shall be used:

Metal mines.....Form WPB-1212
Coal mines.....Form WPB-2784
Non-metallic mines.....Form WPB-2758
Core or churn drill operators..Form WPB-2952
Smelters and refineries shall apply by letter.

In issuing and cancelling serial numbers, the War Production Board will consider the importance to national defense of the present and prospective output of materials to be produced, the consumption of the critical material involved, and the importance to national defense of competing demands for such material, and competing demands for manpower and transportation. Serial numbers issued under Preference Rating Orders P-58 and P-73, and not cancelled prior to December 24, 1943, are hereby confirmed and shall be considered as having been issued under this Order P-56.

Use of Priorities Assistance; All Producers

(g) *Application and extension of priorities assistance.* The way to use preference ratings is explained in Priorities Regulation No. 3, and the way to use allotments, both in placing authorized controlled material orders and in making allotments, is explained in CMP Regulation No. 1. Instead of using the certification prescribed by those regulations or by any other regulation of the War Production Board, including Priorities Regulation No. 7, the producer may use the following endorsement signed manually or as provided in Priorities Regulation No. 7:

Allotment number .....
Preference rating .....
Order authorized under Preference Rating Order P-56, Serial No.....

He shall not add the symbol "MRO" despite the certification instructions in CMP Regulation No. 5 or any other regulation. Requirements of other orders of the War Production Board as to special certifications remain applicable, but the foregoing endorsement shall be added to such certification. The use of the foregoing endorsement shall be added to such certification. The use of the foregoing endorsement by a producer shall constitute a representation by the producer to the seller and to the War Production Board, subject to the penalties of section 35A of the United States Criminal Code (18 U. S. C. 80), that to the best of the producer's knowledge and belief he is authorized under applicable War Production Board orders and regulations to place the delivery order, to receive the item ordered for the purpose for which ordered, and to use the preference rating or allotment symbol for this purpose. Preference ratings assigned under this order for maintenance, repair, and operating supplies may not be used to obtain items on List A or List B of Priorities Regulation No. 3, except where that regulation permits the use of a P-56 rating for a particular item.

(h) *Restrictions on receipts and inventories.* Notwithstanding the provisions or any other order or regulation of the War Production Board, including CMP Regulation 2, receipts and inventories of producers shall be subject to the following restrictions only: No producer shall receive any delivery of material which will increase his inventory of such material to an amount greater than the minimum necessary to sustain his current level of operations; and the ratio of such inventory to current production shall in no event exceed the ratio of average inventory to average production for the years 1938, 1939, and 1940.

(i) *Restrictions on use and resale of material.* Notwithstanding § 944.11 of Priorities Regulation No. 1, no producer shall use any material, whether or not obtained pursuant to this order, for any purpose other than that for which priorities assistance was granted to acquire it; nor may he sell any material (including machinery and equipment), which he has used in the conduct of any enterprise described in paragraph (b) (1), whether or not he obtained such material with priorities assistance under this or any other order, except:

(1) To a producer holding a serial number hereunder, or

(2) With the written approval of the War Production Board applied for by letter to the Mining Division, or

(3) With the written approval of a district if he is a non-serialized producer located within such district, or

(4) As permitted by Priorities Regulation No. 13.

Applicability of Other Regulations and Orders

(j) (1) *CMP Regulation No. 5 and other regulations of the War Production Board.* None of the restrictions contained in CMP Regulation No. 5 shall be applicable to producers, and no producer shall obtain any material under CMP Regulation No. 5. However, privileges under other orders and regulations of the War Production Board granted to persons on Schedules I and II of CMP Regulation No. 5 shall be considered as applicable to producers operating under this order. For example, Order E-5-a on gauges and precision measuring hand tools classifies a person on Schedules I and II of CMP Regulation No. 5 as an "approved user." Producers operating under Order P-56 are in the same position providing that certification clauses and all other provisions of such other orders are complied with.

(2) *Restriction on use of priorities assistance.* No foreign producer or district shall acquire maintenance, repair, or operating supplies through the use of any preference rating except after having received an approved application on the foreign mine quota application Form WPB-2937, from the Mining Division, War Production Board, Washington 25, D. C. No producer shall acquire any machinery or equipment (other than maintenance, repair, and operating supplies) through the use of any preference rating or any specific authorization of the War Production Board except after filing Form WPB-1319 in the manner above provided, which shall be accompanied by the special application form, if any, required by any other order, or except after filing a project application.

Miscellaneous Provisions

(k) *Records and orders.* Each producer and each distributor acquiring maintenance, repair, or operating supplies pursuant to this order shall keep and preserve for a period of not less than two years accurate and complete records of all such materials so acquired and used or disposed of which shall upon request be submitted to audit and inspection by duly authorized representatives (of the War Production Board.

(l) *Reports.* Producers will file such report forms as may be required from time to time by the War Production Board, subject to the approval of the Bureau of the Budget, pursuant to the Federal Reports Act of 1942. The reporting requirements of this order have received the approval of the Bureau of the Budget pursuant to the Federal Reports Act of 1942.

(m) *Additional assistance and appeals in individual cases.* If the sound working condition of a producer is adversely affected by any provisions of this order or by inability to obtain material essential for repair, maintenance, or operating supplies, the producer may apply to the War Production Board for additional assistance by letter, in triplicate, giving the reasons why such assistance is essential. In case of breakdown, imminent breakdown, or other emergency, the application may be made by telegraph or telephone.

(n) *Communications.* All reports and applications hereunder and all other communications with respect to this order shall, except as otherwise specifically provided, be addressed to the Mining Division, War Production Board, Washington 25, D. C., Ref. P-56.

(o) *Violations.* Any person who wilfully violates any provision of this order, or who, in connection with this order, wilfully conceals a material fact or furnishes false information to any department or agency of the United States is guilty of a crime, and upon conviction may be punished by fine or imprisonment. In addition, any such person may be prohibited from making or obtaining further deliveries of, or from processing or using, material under priority control and may be deprived of priorities assistance.

Issued this 5th day of April 1944.

WAR PRODUCTION BOARD,
By J. JOSEPH WHELAN,
Recording Secretary.

INTERPRETATION 1

APPLICABILITY TO CUTTING AND POLISHING OPERATIONS AT THE QUARRY

The term "producer" as defined in Preference Rating Order P-56 includes persons operating a quarry and also persons conducting further cutting and polishing operations at the quarry site, such as the manufacture of building stone and tombstones. These latter operations are included in the phrase "preparation for shipment, of the products of mining activity" appearing in paragraph (b) (1) (i) (§ 3201.11) of the order.

Since paragraph (j) (1) of the order forbids "producers" from obtaining any materials under CMP Regulation 5, producers of tombstones or other stone products at the quarry site may not operate under this regulation but must get priorities assistance exclusively under Order P-56.

The manufacture of tombstones and structural stone at a separate plant away from the quarry is not covered by Order P-56, and priorities assistance for MRO supplies required in such operations may be obtained under CMP Regulation 5. Under CMP Regulation 5, a rating of AA-2 is assigned to persons engaged in the manufacture of structural stone, while persons engaged in the manufacture of tombstones and monuments may use the AA-5 rating which is assigned under that regulation to unlisted business. (Issued Nov. 13, 1943.)

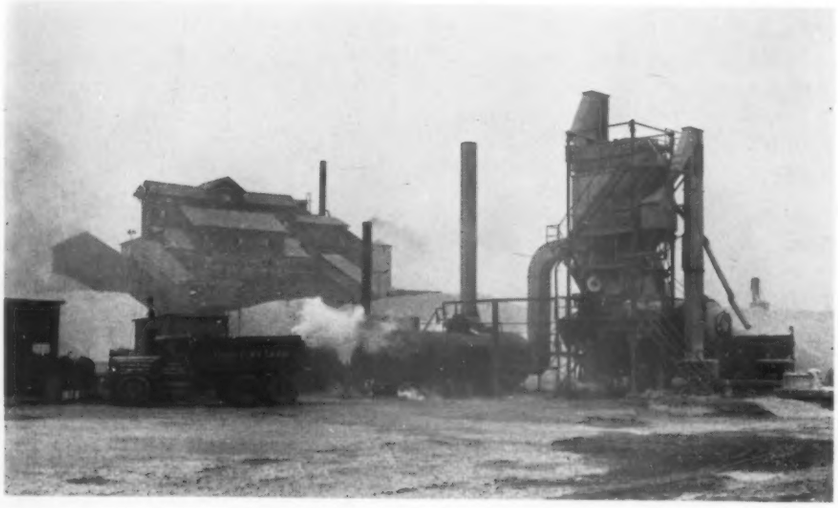
TRANSPORTATION TAX.— Two rulings of interest to the nonmetallic-mineral industries have recently been made by the Treasury Department with relation to the transportation tax of 3 per cent.

First, beginning June 1, 1944, the exemption of federal government agencies from payment of the 3-per cent. transportation tax will come to an end. This is in accordance with the provisions of the Revenue Act of 1943 and is covered by Treasury Department order TD 5354 published April 4, 1944. As a consequence all shipments of material to a federal government agency will be subject to the tax irrespective of whether the government agency pays the transportation and of whether the shipper prepays the transportation charges. Other government agencies — states, counties, municipalities — continue to enjoy the benefit of exemption from payment of the tax.

Secondly, the Treasury Department, Bureau of Internal Revenue, has ruled, in a letter of April 10, 1944, addressed to V. P. Ahearn, executive secretary of the National Sand & Gravel Association and J. R Boyd, administrative director of the National Crushed Stone Association, that the payment of the 3-per cent. transportation tax is waived in those cases where materials are shipped to a federal government agency in care of a contractor. The fourth paragraph of that letter, which was written in response to a query raised by the association executives named and is signed by D. S. Bliss, Deputy Commissioner of Internal Revenue, reads as follows:

"This office has held that where a shipment is consigned to a government agency in care of a contractor, the exemption provided by section 3475 (b) of the Code, as amended by Public Law 180, applies to the amounts paid for the transportation of such shipment, irrespective of whether the transportation charges are paid to the carrier by the government agency. In such case, the shipping papers must clearly show that the property is consigned to the government agency in care of the contractor."

Plant-Mixed Material Paves Parking Areas and Roads at Big War Plant



The Bellwood asphalt plant of the Graham company with crushing-and-screening plant of the Consumers Company in distance.

another ON THE SPOT report

ONE of the largest war plants erected during the present emergency is the Dodge-Chicago airplane-engine plant of the Chrysler Corporation in Chicago. The preparation and delivery of the concrete for this job has previously been described in PIT AND QUARRY. As construction neared completion on the plant proper, the building of access roads and parking areas for the automobiles of about 40,000 workers to be employed was under-

By HARRY F. UTLEY

taken. Approximately 500,000 square yards of pavement was involved.

The contract for this work, all of asphaltic construction, was awarded the Graham Paving & Construction Company of Chicago. Base courses for the parking areas were of 7½-inch water-bound macadam with 1½ inches of plant-mixed asphaltic surface. The largest parking area was a mile in length and about 800 feet wide. Roadways had 11-inch water-bound macadam bases with 2 inches of asphaltic surfacing.

One of the difficulties which the Graham company faced was the provision of temporary parking space for the automobiles of 25,000 construction workers. It was necessary to shift these locations back and forth as the macadam base was compacted and again after the asphalt surface was applied.

Stone for the base course was supplied by the Consumer Company from its various quarry plants near Chicago. The deliveries, made by dump truck, averaged 3,000 to 3,600 cubic yards daily. Five motor-patrol graders, three 10-ton rollers and two 8-ton tandem rollers were used to spread and compact the base. The screenings were applied by two Buckeye spreaders and the water by two asphalt distributors. Since the contractors needed the distributors anyway for the application of the prime coating of bitumen, it was decided to use them first for applying the water to bind the base macadam under pressure.

This view shows the cold-stone elevator, the drier from burner end, and the dust-collector ducts.

Nearly all the bituminized aggregates were prepared in a new Simplicity S-75 asphalt plant which was purchased primarily for this job and erected on the property of the Consumers Company at Bellwood, Illinois, a suburb just west of Chicago. Thus the aggregates were close at hand. The 33,000 tons of materials were mixed by the batch-weighing and batch-mixing method and delivered for the surface course at the Dodge-Chicago job. The asphalt plant was able to exceed its capacity and produced an average of 1,125 tons per day. Two Barber-Greene spreaders placed the material on the job.

At the asphalt plant a Link-Belt Speeder clamshell crane supplied the aggregates to a duplex variable-speed apron-feeder just ahead of the cold-material elevator which supplies the drier. The aggregates are discharged from this elevator and enter the outer shell of the Simplicity horizontal-type double-shell rotary drier, which is 8 feet in di-

Another plant view with the clamshell crane in foreground.

ameter and 15 feet long. After traversing the outer shell they are returned through the inner shell, entering and leaving by the feed end of the cylinder. Firing is done by a Ray Type TG oil burner, the firing chamber being lined with A. P. Green firebrick. A steam-driven turbine operates the blower on the oil burner and atomizes the fuel.

A Simplicity cyclone dust-collecting system, an important part of the installation, is connected to the drier, drawing the dust from the latter

Duplex apron-feeder at point of discharge into boot of elevator.

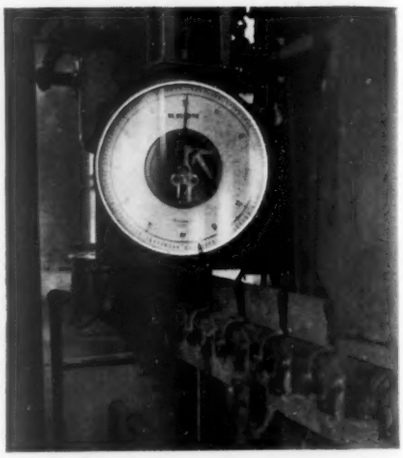
counter to the flow of the material. This collected dust is discharged, along with the stone from the drier, to the hot-material elevator which discharges the materials on a 4- by 12-foot double-deck inclosed Symons vibrating screen located above the bins. The screen has divided decks and makes 1-, ¾-, ¼- and minus ¼-inch sizes, the four products being chuted to the four compartments of the 50-ton bin. Stone over 1 inch in size is rejected and stockpiled. The levels of the material in the bin compartments are controlled by Bindicators. Stone dust, obtained in bags from the Consumers Company plant, is used for filler. A workman empties the bags into the boot of an elevator which carries it up to the separate dust bin adjoining the stone bin.

On the batching platform the hand-operated valves which control the flow of the dry materials into a 5,000-pound weigh box are steam-actuated. Weighing of the batches is done with a Kron springless dial scale.

The asphalt is received in tank cars and is steam-heated before being unloaded into the Simplicity asphalt storage tank. This has a storage capacity of 24,000 gallons and has a special inner well for preheating the material before it is pumped to the weigh-bucket in the plant. Only enough asphalt is kept hot in the inner well to supply the needs of the mixer, making it unnecessary to heat the entire supply in storage. All the heat is thus utilized and, of course, results in a considerable saving in fuel cost. As the hot asphalt is drawn off, the cooler material from the main storage tanks flows in automatically. A Kinney 4-inch pump transfers the asphalt from cars to storage and also pumps the hot asphalt to the steam-heated accumulator tank above the asphalt weigh-bucket. This weigh-bucket is equipped with a Kron dial scale similar to that used for weighing the aggregates, the dials being located at opposite ends of the operator's platform, easily visible from his post at the control valves.

Aggregates and asphalt, after being weighed, are discharged into the Simplicity pug-mill mixer which has a capacity of 5,000 pounds. The mill is steam-jacketed and is equipped with two pug shafts which are geared together. Steam-operated sliding doors discharge the batches into waiting dump trucks for delivery to the job.

Although the plant has been operating as a cold-mix unit, it can quickly be converted to the production of hot mix as well by installing another burner on the opposite end of the rotary drier. When producing cold mix, the aggregates are dried in the outer shell and cooled in the inner shell, the hot-mix-furnace end being open to the atmosphere and serving merely as a conduit for cool air to reduce the temperature of the aggregates. For hot-mix operation, the aggregate is dried in the outer-shell compartment and superheated as it travels through the inner shell by the blast from the furnace.



One of two dial scales on operator's platform.

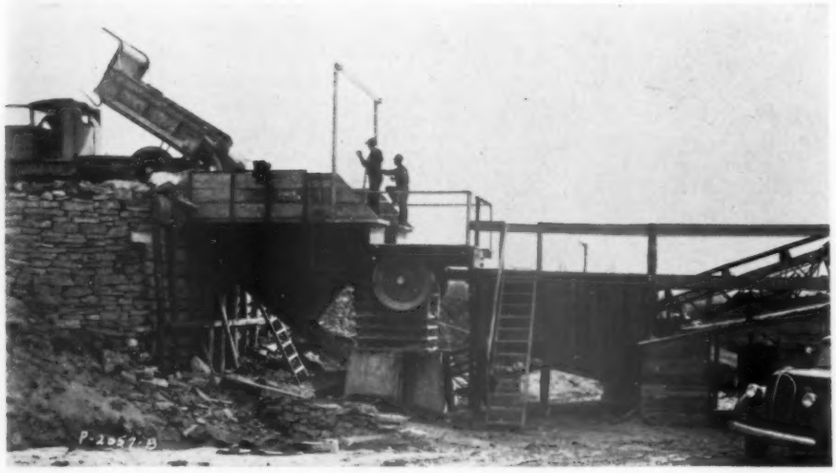
While the Graham company expects to keep the plant at its present site on the Consumers quarry property, it can be quickly dismantled and shipped to another location should that be necessary. The company is engaged in paving work in Chicago and surrounding states. J. W. Trickel is president and G. J. Woeber is general superintendent.

Picture taken at time plant was being erected with bin ready to be hoisted to top of supporting structure at right.

Extensive Improvements at Lawrence Plant

Acting under permission granted by the War Production Board, the Lawrence Portland Cement Company has begun engineering work on improvements in the production facilities of its plant at Thomaston, Maine. According to James H. Ackerman, president of the company, the changes will include conversion of the two existing 200- by 11-foot kilns into one of the same diameter 362 feet long, the structural alterations which that change necessitates, and the construction of a new building for the coal mill and the installation of a new Fuller air-quenching cooler. The plant's annual capacity will be reduced about 25 per cent.—from 1,200,000 barrels to 900,000 barrels. It is expected that the improvements will be completed by September 1. F. L. Smidth & Company are the consulting engineers.

Well-Planned Feeding in Aggregate Plants Will Pay Excellent Dividends



Traveling-grizzly feeder and crusher.

By O. J. ELLERTSON
Assistant Secretary
Pioneer Engineering Works

THERE is probably no other single factor in the design or construction of an aggregate plant that costs so little and will pay such high dividends as proper feeding. In considering this operation, one should go further than the primary feeding to the plant. It covers feeding to the primary crusher, the secondary crusher, screens, conveyors, elevators and dewatering devices. Every time material is handled it must be fed to the next unit. Each of these transfers can cause a bottleneck, spillage, excessive wear, and often it reduces efficiency and capacity.

In quarry plants the first point of feeding to consider is the primary crusher. This feed is important because it determines the output of the entire plant. Proper feeding will keep the primary crusher operating at full capacity. The primary crusher, in turn, acts as a feeder for the remainder of the plant. In feeding a primary crusher the supply should be regulated by the operator so the crusher is always full but not overloaded, and it should never run empty.

In feeding small crushers the rock can be dumped on a long platform which slopes at about 15 degrees toward the crusher. The rock is then raked into the crusher by man power.

For larger crushers a power feeder of some type will save many times its cost. The forged-steel apron-type feeder is suitable for many feeding jobs. It consists of an endless series of overlapping pans. Rock is dumped on the feeder and the pans carry it into the crusher. A clutch allows the operator to start and stop the feeder at will. In this way he keeps the load on the feeder and does not choke the crusher. He also keeps rock in the crusher at all times so it does not run empty. The clutch on a feeder is like the throttle on a locomotive. With one hand on the clutch lever the operator has complete control of the input to the crusher and the output of the plant.

The manganese-steel apron-feeder is similar in operation, but is built larger and heavier. The pans are made of cast manganese steel and are heavily reinforced. It is recommended for use with large primary breakers and for handling heavy or abrasive materials.

The traveling-grizzly feeder controls the feed in the same way as the apron-feeder, and also by-passes fines and dirt. The flights may be constructed from extra heavy pipe. They are mounted cross-wise of the feeder and each end is carried by a heavy chain. The bars are spaced about 2½ inches apart and the small material passes through the bars and is gathered in a hopper below. If the quarry is dirty, the dirt can be rejected through the traveling-grizzly feeder and then conveyed away. If the fine rock is wanted, it is discharged on the same belt-conveyor that passes under the primary crusher. In this way the fines are by-passed around the crusher and then mixed with the crusher product.

Regardless of the type of feeder used, it should be clutch-controlled, so the operator can control the feed. It should be shut off before the crusher is overloaded or choked. The feeder should also be stopped to break up or remove rocks that are too large to go into the crusher. The feeder should always have an ample supply of rock so it can be started and keep rock in the crusher at all times.

In feeding to a secondary roll crusher the problem is a little different. The roll crusher is usually fed from a screen or belt-conveyor. Secondary crushers are limited in the size of rock they will receive; consequently it is essential to control the feed so rocks that are too large do not get into the crusher. Rocks that are too large will ride between the shells, cause excessive wear and eventually wear grooves in the shells.

Mechanical plate-type reciprocating feeder.

It is preferable that the feed to a secondary crusher be screened through an opening that rejects all rocks that are too large. If the feed is not screened, the primary crusher should be adjusted close enough so the product will be readily crushed by the roll crusher. The rock should be spread evenly over the full width of the shells. If material is allowed to be concentrated on one side of the rolls, or in the center, the shells will wear down at that point. By

Feeding to belt-conveyor with tractor and bulldozer through grating.

feeding the rock to one roll just back of the center, that roll will act as a feeder and will help to spread it before it passes into the crushing zone between the two rolls.

When feeding a vibrating screen, the material should be uniform and be spread to the full width of the screen. Intermittent feeding will reduce the efficiency and capacity. Rock will carry over the screen and it may cause plugging. Steady feeding allows the screen to operate at maximum capacity and will produce a uniform product.

In order to utilize the full length and area of the screen the material should be fed to the full width of the screen cloth. It is preferable to feed a screen over the belt-conveyor or feeder. If it is necessary to feed by a spout from the side, the spout should be so designed that it will discharge the material over the entire screen width. The feeding spout should be designed so that it will discharge directly on to screen with as little drop as possible. A heavy, high discharge on the screen tends to unbalance it and reduces efficiency. Falling rocks will also batter the wire screen and require frequent replacements. If a high discharge can not be avoided, it will save the screen if the material is discharged on a plate or an inverted channel. The inverted channel forms a pocket and the material builds up its own cushion.

If the material is to be washed on the screen, a heavy stream of water can be used to carry the material down the feed spout. This will help to wash the aggregate and will spread it out.

In feeding a belt-conveyor there are several factors to be considered. The best results will be obtained if the belt is operated at its maximum capacity. It is preferable to reduce the belt speed rather than run it half loaded. Conveyors are limited in the size of lumps they will handle, consequently the feed should reject any rocks that are too large for the conveyor. A grate mounted over the feed hopper is usually satisfactory for this purpose.

The principal wear on a conveyor belt occurs at the loading point. An ideal loading chute would be so located that the material leaves it moving in the same direction as the belt and as nearly as possible at the same speed. Loading at an angle with the belt travel will increase abrasive wear and may cause the belt to shift and climb the idlers. When it is necessary to load a belt from the side, the chute should be designed to deflect the fall so the material is discharged in the direction of the belt travel.

Lumps falling directly against the rubber surface are responsible not only for a large percentage of wear, but frequently cuts, gouges, and fabric breaks. A common device to save this wear is a mechanical arrangement to allow fine material to fall on the belt first, thereby providing a cushion to receive the lumps. This can be accomplished by a screen or grizzly, but excellent results have been obtained by cutting a notch at the mouth of the chute, which allows the finer material to drop on the belt first. If the chute is at a slight angle with the belt, the notch can be cut lopsided to deflect the load in the direction of belt travel.

If the supply of aggregate is delivered in intermittent loads, as from trucks or shovels, a mechanical feeder should be used. Without the feeder the load is carried on the belt and the belt must drag out from under its weight. With the mechanical feeder the load is carried in the hopper and the feeder pan discharges a continuous feed on the belt. The mechanical feeder also makes possible accurate control of the volume fed to the belt.

The reciprocating-plate feeder consists of a hopper with a movable bottom plate. The plate is actuated by a crankshaft and discharges a set amount with each stroke. The volume can be regulated by increasing the gate opening or by increasing or decreasing the speed of the strokes.

The apron-type feeder can also be used for feeding belt-conveyors. Several troughing idlers should be located under the feed point. The ideal feed is to the belt between the idlers, but the idlers must be close together to support the belt without too much sagging. If the material is heavy, rubber-tired idlers can be used under the feeding point. They will absorb the shock and save the belt from sharp impact.

Feeding conditions will vary with every installation. Each transfer point will vary with materials and design. Each feeding point requires individual treatment. It takes time, ingenuity and care. But good feeding is well worth the effort and will increase production and save equipment.

Workers Donate Time for Special Plant

From Cedar Rapids, Iowa, comes an unusual story of patriotism.

As a memorial to a fellow worker, Louis M. Parks, missing in action since January 28, 1943, the men and women of the Iowa Manufacturing Company, more than 1,000 in all, built on their own donated time a complete 25-cubic yard crushing-and-screening plant and presented it to the government. The workers knew the daily capacity of the manufacturing concern to be one unit; so on Sunday, December 19, all were on hand to construct one additional crushing plant for the government as a gift. At the end of eight hours the job was done.

Since the Iowa Manufacturing Company is owned entirely by those working in it, and the time donated included that of management as well as labor, the cost of materials as well as of fabrication was covered in the gift.

The plant will bear a plate designating it as "Louis M. Parks—Spirit of Cedar Rapids." The army has promised to ship it immediately to some foreign theater of operations and to follow its record, reporting back to those who built it, that they may know their efforts were not in vain.

THE EVOLUTION OF THE CRUSHER

By W. E. FARRELL

President, Easton Car & Construction Company

STONE was not "crushed" until after 1858. All the small stones required for the construction and repair of highways and railroads were previously "pounded" or "broken" by professional "stone-crackers" or even by women, children or old men. This operation was not performed in the quarry, but alongside the road where the material was to be used.

Road supervisers were not selected on account of their experience or skill; their job was either honorary or thankless. The engineer considered it beneath his calling; he confined his efforts to more complicated matters such as designing bridges, or a cut through a hill, or an embankment requiring more than ordinary skill.

With the reduction in the time required to travel from London to Edinburgh by the "Flying Coach" from 13 days in 1712 to 3 days in 1784—in view of which it was common for the daring traveller to make his last will and testament—and because of the competition and threat of "the insatiable capacity of the all-devouring railways," against which it was claimed to be "a shame that the public preferred their excessive speed to the low cost of transportation," bigger and better highways became a necessity.

Figure 1.

At this critical moment two men arose. Both were born in poverty and both rose to great wealth and prominence in their respective fields of highway construction. One, Thomas Telford (1757-1834), became the first president of the Institute of Civil Engineers. He advocated laying first a bed of large stones and covering this with a layer of small stones some 2 or 4 inches thick.

The other, John Louden Macadam (1756-1836), came to New York at the age of 14, apprenticed to his uncle and returned to England in 1783 at the age of 27 a very wealthy young man. He took advantage of his leisure to make a study of road construction. His method was to use only small stones throughout the entire depth of the roadbed. He would use only gravel, broken if necessary, or stones not over 2½ inches in any direction or preferably not over 6 ounces in weight, for which his inspectors carried a balance and a 6-ounce weight.

Macadam's method attained greater popularity, though for some time he was engaged chiefly in "lifting" roads, *i. e.*, removing the top surface to a depth of 4 or 5 inches, breaking the large stones therein and relaying the surface. He claimed that the cost should not exceed 4 cents per square yard to remove the stones, break them, relay, smooth the surface and clean the water courses.

Macadam further held that "the proper way to break stones to the size required was by women, boys and old men in a sitting position,

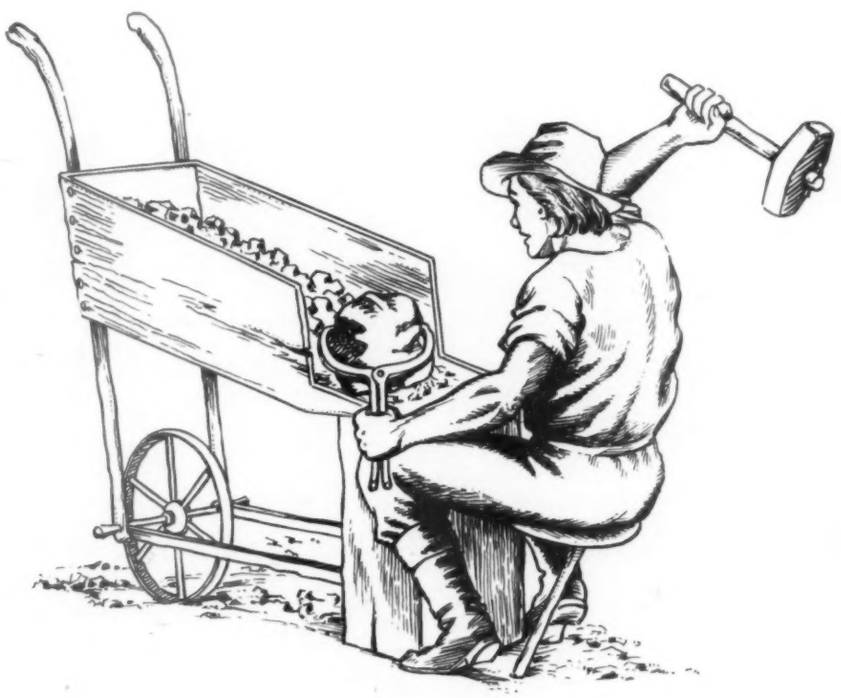


Figure 2.

using a 1-pound hammer with a face the size of a *new* shilling." The stone to be broken was to be held in the fork of a stick upon an anvil of harder stone. There were of course many professional "stone-knappers" and frequently the entire family was engaged in the same occupation.

The stone to be broken might at times be procured from large quarry operations as spalls from the production of cut stone for buildings. In this case they were first broken by men standing and using hammers

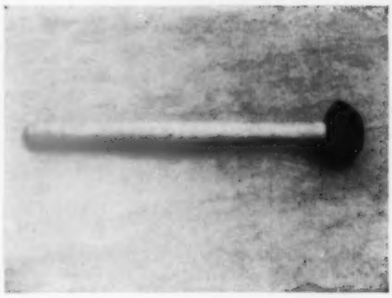


Figure 3.

weighing some 4 to 6 pounds (Figure 1.)

To avoid sitting on the ground or a pile of stones someone produced the machine shown in Figure 2. This machine was either of the stationary type or movable as shown in the illustration. The stone to be broken was held within a 6-inch iron ring provided with a handle. The operator sat on the seat shown and his face was protected from injury by the flying pebbles by a mask of wire.

The success with these better roads in England aroused interest everywhere and especially in America, which needed just then to be united physically as well as legally. Road-building here took the form of private ventures known as toll-roads or turnpikes. There were bridges and bridge tolls separate from the highway tolls. In general these roads proved to be unprofitable investments. "Plank roads" followed, but after about ten years' trial these proved no better investment and were abandoned. By this time we had learned that good highways were a matter of state and national importance and should be scientifically laid out and constructed.

In 1840 a French engineer, impressed by the great waste of labor employed in breaking stones by hand, felt the need of using a machine for this work. He wrote: "Stone broken annually in France for roads can not be less than 5,000,000 cubic yards, and is done by hand in the most imperfect manner and is very costly." He suggested a machine very similar to the modern hammer-mill or perhaps a cylinder revolving on its axis over a horizontal plane or one with two cylinders revolving toward each other. He also realized the need of a very heavy fly-wheel.

His views were very energetically opposed by a more conservative engineer who saw no reason to discard operations by blows, as it had been a mechanical force employed for so many years and in so many other mechanical operations. This engineer particularly ridiculed Macadam's idea of breaking stones from a sitting position. At the best he visualized only the need for a great number of small machines requiring frequent removal, protection from the weather, and endless repairing.

Although within the life of some still living we have seen commercial stone being broken alongside the highways, it does seem odd to read in a book on highway construction, published in 1896 that, "Although the crusher has done much to cheapen highway construction it does not follow that the hand breaking of stone should be abandoned. I protest against the assumption that no economy in building macadamized roads can be attained without the use of a crusher. Its cost will limit its use to relatively rich communities. The output of a crusher should be 100 tons per day and the crushers should be set up at intervals of two miles." Yet as late as the summer of 1942 the hammer shown in Figure 3, a distinctly American design with its round head, was purchased in Tennessee.

The term ballast was at first applied to material for roads as well as for railroads. It is derived from the accident that a ship unloading at New Castle had her hold loaded with stone as ballast. The first ballast for railroads was composed of pebbles, scoriae, gravel and cinders. It is very probable that Robert Stevens was the first to use ballast in America for railroads. During the construction of his railroad from Camden to Amboy he was delayed by the failure to receive on time some badly needed stone posts from Sing Sing. In his dilemma he laid logs across the roadway, "cross ties," and may have tamped them with broken stone. In any event it is recorded that the result was an equally serviceable track and one much more comfortable to ride on.

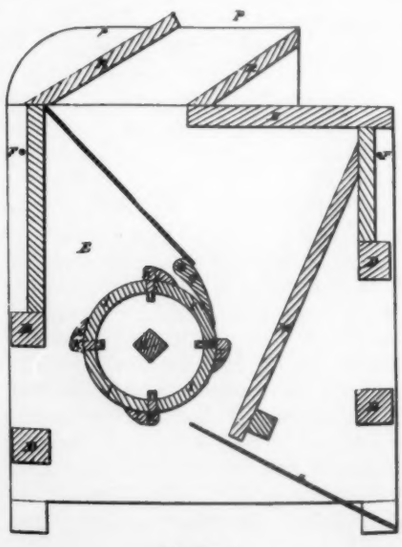


Figure 4.

So with the combined demand for broken stone for highways and railroads American ingenuity got to work; even so 28 years passed after the first application for a patent on a crushing machine was filed before the problem was solved.

The first United States patent was granted to William H. Bell of Fortress Monroe and T. P. Andrews of Washington, D. C., on July 9, 1830, for a "Machine for Breaking Stone and Thrashing Grain." This machine consisted of a pot of mortar

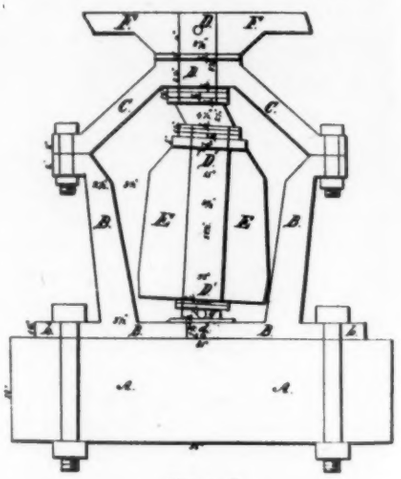
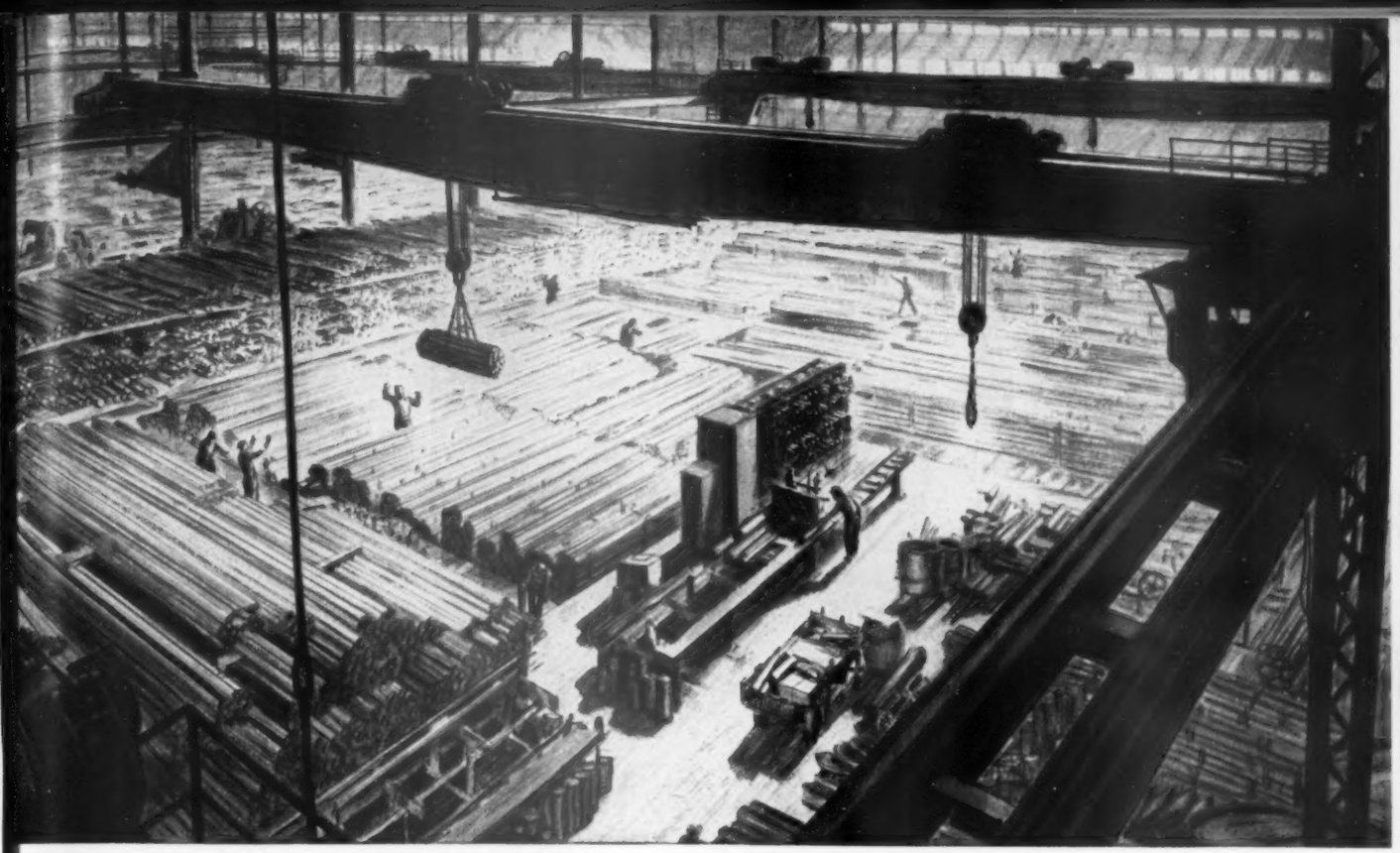


Figure 5.

in which the stones were put. The bottom of the mortar was made of equally spaced iron bars to control the size of the product. The stones were broken by means of a 300-pound weight attached to the lower end of a vertical shaft, the shaft being alternately raised and dropped. Apparently there are no drawings of this machine.

The idea that blows were required to break stone was in the minds of the next inventors. On June 27, 1840, Messrs. Cooper, McConnel and Lukens of Ohio were granted patent No. 1,660 for a "Machine for Breaking Stone for the Construction of Macadamized Roads and other Purposes." This machine consisted of a wooden box about 5 feet high by 3½ feet long and 2¾ feet wide. In the box was a cylinder some 14 inches in diameter to which were attached a series of iron hammers. The cylinder revolved at 350 r. p. m. and was "adapted to four horse power." For other details see Figure 4.

The first successful machine was based on the idea of crushing stone instead of breaking it by blows. On June 15, 1858, Eli Whitney Blake of New Haven, Connecticut, was granted patent No. 20,542 for "A new and useful Machine for Break-



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ing Stones for Road Metal and other Purposes, which machine I call a Stone Breaker." After stating that "the machine may be made of any size," he claimed the combination of the following features in the construction, arrangement, and movement of the jaws:

1. The acting faces of the jaws upright.
2. The acting faces of the jaws convergent.
3. Giving a short vibratory movement to the movable jaws.

Mr. Blake was a member of a commission appointed in 1851 to construct some two miles of macadam road on one of the principal streets of New Haven. It required 2 days labor by hand to produce a cubic yard of broken stone. He was so impressed by the delay in construction that he devoted the following seven years to the development of a machine to do this work.

The first machine was built by the McLagon Foundry Company then located at 100 Audubon Street, New Haven, Connecticut. This machine was first placed in operation at the corner of Beaver Brook and Blake Streets. Efforts have been made to

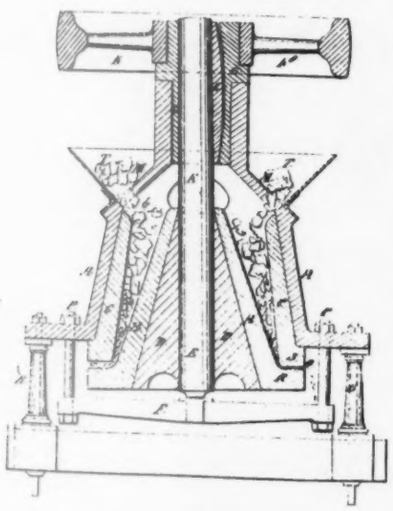


Figure 6.

mark these two places with appropriate tablets, but they were not successful. The location of where its worthy companion the steam excavator was first made has also gone unidentified.

The Blake crusher not only solved the stone-breaking problem, but other problems no less important. It was of great value to the mining industry. Of 509 crushers sold in the first ten years, 319 were purchased to crush iron, gold and silver ores.

The success of the Blake crusher brought many infringements and some improvements, but no new principle until the gyratory was conceived and developed to become a real competitor.

The first patent for a gyratory crusher was granted to George H. Wood of Wisconsin on April 24, 1860, for a "Machine for Crushing Stone, Quartz, Ores or any other Substance Capable of Being Reduced or Pulverized by Pressure." The machine was driven by a pulley attached to the shaft extended through the upper bearing. The shaft was offset just below the top bearing to give a vibratory motion to the crushing cone. The discharge

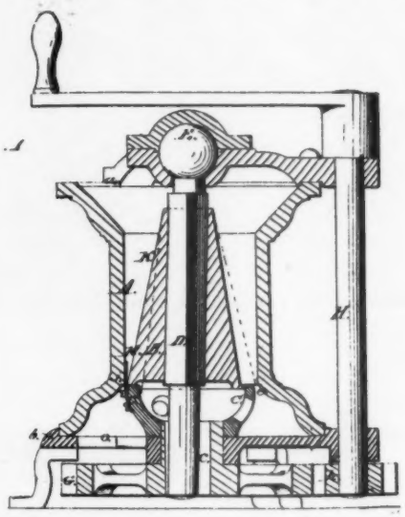


Figure 7.

opening was predetermined, there was no provision for adjustment. (See Figure 5.)

On July 31, 1866, patent No. 56,793 was granted Henry Pearce of San Francisco for an "Improvement in Quartz Mills for Crushing and Pulverizing Quartz, Rock, Stone and any Description of Ores." This crusher was also driven through an overhead pulley. The bottom of the shaft rested in a bearing, supported by a cross bar which could be lowered or raised to control the size of the discharge. (See Figure 6.)

The next patent, No. 88,216, was granted to James W. Rutter of St. Louis, Missouri, on March 23, 1869, for an "Improvement in Crushing and Grinding Ores." The shaft was supported at the upper end in a ball-and-socket bearing, while the lower end was in an eccentric bearing, which was made to rotate through gearing. The chief claim was the use of a gage ring to prevent the escape of material before it was sufficiently crushed. (See Figure 7.)

The first gyratory which at all resembled our modern machines was covered by patent No. 201,646, issued to Charles M. Brown of Chicago, Illinois, on March 26, 1878. His claim was for "An Improvement in Ore Crushers and Grinders." This crusher retained the ball-and-socket

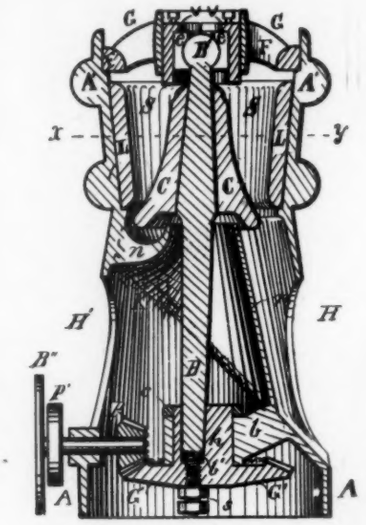


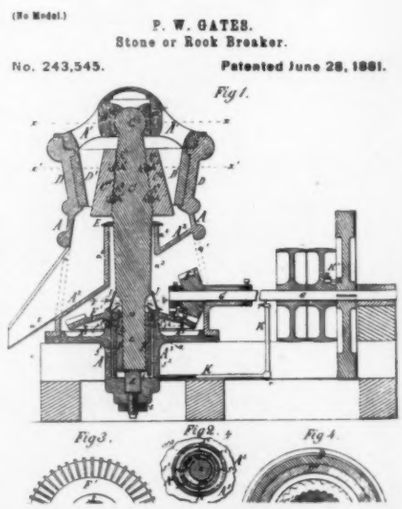
Figure 8.

bearing at the top end of the shaft and also the gear-driven eccentric bearing at the lower end. The main claim was the easy adjustment of the shaft up or down by means of a screw which supported the bottom of the shaft. (See Fig. 8.)

The Eagle Iron Works of Chicago, later known as the Gates & Scoville Iron Works, and still later as the Gates Iron Works, started to exploit this type of crusher and made a commercial success of it, after making certain improvements which were necessary.

On June 28, 1881, the first of several patents, No. 243,545, was granted to Philetus W. Gates of Chicago for certain new and useful "Im-

(Continued on page 118)


(No Model.)

P. W. GATES.

Stone or Rock Breaker.

No. 243,545. Patented June 28, 1881.

Fig 1.

Fig 3. Fig 2. Fig 4.

Figure 9.

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ARC WELDING KEEPS EQUIPMENT RUNNING

THE low cost and simplicity of applying electric-arc welding in repair and maintenance work is playing a big part in keeping existing equipment, much of which is irreplaceable to-day, in first class condition. The accompanying photographs show five typical arc-welding applications recently handled by the Commonwealth Quarry Company, at its plant at Summit, New Jersey.

In crushing stone in a gyratory type crusher machine, the concave surfaces of these metal blocks are subjected to severe impact and abrasive action of the stone. By arc-welding the contact surfaces with ¼-inch coated electrodes, specially made for impact and abrasion-resisting welds on manganese steel, the worn surfaces are built (Figure 1) up to their original effective working thickness at a saving of $400 compared with the cost of a new set of both upper and lower concaves, or a total saving to the company of $1,600 per year.

Fig. 1—Welding operator is pointing out surfaces of crusher concave which are resurfaced by arc welding with weld metal having a hardness of 170 to 190 Brinell.

Fig. 2—Stone tong being reclaimed by arc welding at a substantial saving in time and costs.

Resurfacing is accomplished by depositing flat, continuous beads parallel along the concave surface after removing all the rust or other foreign matter from the work. The resistance of the weld metal to impact and abrasion is equal to that of heat-treated cast manganese steel. Even if new concaves were obtainable, it would take about 12 weeks to obtain delivery, so that the time saving alone made possible by welding is an important factor. A 300-ampere portable welding machine was used for this job.

Figure 2 shows the arc-welding process being applied in building up a tong used on equipment for lifting jetty stone. Impact and abrasion had worn this part down excessively, but by welding the part was restored as good as new. Although the tongs are repaired only once every two years at a cost ranging from $50 to $150, annual savings of from $200 to $300 are effected against replacement costs of approximately $650.

In Figure 3 the welder is pointing to the sliding jaw of a crane clutch which had become badly worn. In this instance building up the sliding jaw with general-purpose electrodes for mild steel, saved the company about $125 against replacement costs of approximately $175. A yearly saving of about $300 is realized by the quarry, which operates seven cranes.

Rebuilding shovel-tooth tips is almost a constant maintenance job in many pits and quarries. At the Commonwealth Quarries the total savings can be appreciated from the fact that a new tooth base and tip cost about $30. To build up the tooth surface by arc welding costs only $5. Bare electrodes made specifically for manganese-steel welding, and which produce weld metal having a hardness of from 230 to 430 Brinell, are used for this resurfacing job, shown in Figure 4. The old tip is first cut off and new tip is fabricated with weld metal. The teeth are used on a 2½-cubic yard bucket, and 16 to 30 teeth are rebuilt per year.

Another important job for welding is the building of new, all-welded frames used in a crusher. All-purpose electrodes for mild steel are used to construct the new frame as shown in Figure 5. This heavy part is also built at a substantial saving in costs of material and time.

Lincoln Electric Company equipment was used in making these welded repairs.

Fig. 3—This travel clutch for quarry crane is reclaimed by arc welding at a saving of about $300 per year.

Fig. 4—When shovel teeth become worn, arc welding restores the teeth as good as new at saving in both time and cost.

Fig. 5—This entire crusher frame was rebuilt by arc welding after it had become excessively worn through constant usage.

The Outlook for Agricultural Liming Materials as Viewed by the A.A.A.

Prepared by
The Office of the Chief
and
The Regional Offices
Agricultural Adjustment Agency
Washington, D. C.

●

IN discussing the needs for agricultural limestone we find ourselves speaking in tonnage figures far in excess of present production capacities, since the greater part of farm land is continually in need of limestone, and because the rate of application has not kept pace with the calcium losses. In an effort to halt the rapid deterioration of our soils, the AAA, in co-operation with other agencies, has for several years exerted every effort to encourage soil-conservation practices, including a greater use of limestone. As a result, the use of limestone has risen from a level of between 3,000,000 and 4,000,000 tons prior to the AAA program to more than 20,000,000 tons in 1942. This compares with an annual need of 30,000,000 to 40,000,000 tons as developed by agronomists studying the problem.

It can not go without comment that, in the record of enormously increased supplies of limestone, the industry can take justifiable pride. On the basis of this splendid record of production, it is reasonable to assume that the annual goal could be met through increased facilities were it not for limitations brought about by the war.

To meet the tremendous war-time needs for feed, food, and fiber crops, farmers are to-day pushing their farm plants to capacity. If they are to continue record production their soil must be maintained in a state of high productivity. In order to do this job well limestone is needed to supply the calcium requirements and promote better growth of grasses, legumes and other vegetation. Farmers are educated to the benefits of limestone as evidenced by the demand. Every effort is being made to insure the needed production through the removal of handicaps, such as shortages of labor, machinery, repairs, trucks and tires. In this the AAA is working closely with the Office of Materials and Facilities, an arm of the War Food Administration established for this purpose.

The AAA has taken many steps to help the industry and the farmer in making supplies available, such as contracting for more railhead delivery to points which have required long truck hauls, encouraging the development of new sources in areas heretofore served from distant points, encouraging increased production from existing plants, encouraging farmers to take year-'round delivery, increasing farm allowances for the use of liming materials in some areas, encouraging farmers to haul as much of the material as possible in their own trucks, and modifying contracting procedure in some areas to enable contractors to commit themselves for definite tonnages.

The use of limestone varies, depending upon conditions in various sections of the United States. Estimates of 1944 requirements on a regional basis are:

Region	AAA Program	Total
	Tons	*Tons*
Northeast	2,164,000	5,000,000
East Central....	3,737,000	5,000,000
North Central...	7,910,000	10,600,000
Southern	1,039,000	1,200,000
Western	154,000	200,000

Northeast Region The agronomic requirement for liming material in the Northeast Region, which includes New York, New Jersey, Pennsylvania and the New England states, based on a survey of the agronomists of these states, is approximately 5,000,000 tons. This compares with an average annual use in this region of about 500,000 tons previous to AAA programs and 2,350,000 tons in 1942.

This increase in production has been primarily due to more efficient plant operation which has resulted from the limestone program being placed on a 12-month basis rather than being concentrated in the spring and fall months. Two cement plants have been converted to the production of agricultural limestone, and one entirely new agricultural-limestone unit has been constructed. In addition, several producers have increased their productive capacity by making plant improvements, mechanizing some operations previously performed by hand labor, and adding to their existing facilities.

East Central Region In this area comprising the States of Delaware, Maryland, West Virginia, Virginia, Kentucky, Tennessee, and North Carolina, the AAA this year has contracts with 215 manufacturers, including about 25 new suppliers, to supply limestone in the East Central Region. In addition, more than 100 contractors will furnish limestone bought from manufacturers, and about 150 truck operators will deliver limestone from plants or railroad cars directly to farms.

In many areas, particularly along the Atlantic Seaboard, large supplies of lime are needed in sections not served by railroads. In these areas local truck operators are engaged by County Agricultural Conservation Associations to transport lime from shipping points to farms.

In view of existing labor and transportation shortages County AAA Committees and suppliers in many places are building up lime stock piles to furnish farmers limestone at any time they are able to receive it. Under this plan the farmer has an opportunity to transport his lime when he can make necessary arrangements, or obtain delivery of it by a truck operator at a time when he can give it proper attention. This plan also enables suppliers to ship lime at a time when labor and transportation facilities are available, and prevents a flood of orders during periods of heavy application.

North Central Region In the North Central Region, where supplies are abundant and the consumption is greatest, the method of distribution to farms varies by states. For example, in Minnesota the majority of the material is contracted for on a delivered-to-farmyard basis and farmers arrange for the spreading on their fields. In Missouri the major portion of the material is delivered and

(*Continued on page* 72)

An Agricultural Liming Program for the South

By E. L. DEAL
Chief, Program Operation Section,
AAA, Southern Division

● The change from a traditional sour-land type of agriculture is particularly strong in the southern states. We invited the author of this article to contribute a discussion of the problems encountered there. Mr. Deal has worked with all the larger limestone producers and with a large number of the smaller plants and has for a number of years attempted to interest liming producers in increasing their production. His experience and knowledge of the problems relating to the production and use of limestone in this area enable him to write with authority on the conditions in the southern region.—DIRECTING EDITOR.

A general farmer consciousness of the need of agricultural limestone predated, considerably, even a limited practice in its use. Any person living on the farm during the period 1900-1915 most likely will recall hearing leading farmers say, "I believe this land needs lime." While research during that period with regard to the need for lime and soil conditioning were quite pointed, at the same time experimental work was not conducted on an extensive scale. For generations the major interest of farmers in the South had been in staple crops or row or clean cultivated crops. With the interest being such it was logical that experimentation and research would run along parallel lines. As late as 1925 very few experimental data, either spoken or written, had been given out.

As a further indication of lack of activity in liming soils, even in later years, one producer of agricultural limestone, upon being questioned as to why he did not undertake a more extensive distribution program stated, "With so little active interest in it and with the comparatively narrow margin of profit which limestone will bear, it simply is not practical to carry on the necessary promotional and sales work."

This briefly reflects the background or nature of a situation out of which has developed some progress in the use of lime in the South. Some progress has been made by connecting a basic interest and research findings with means and methods of making the materials available or accessible.

To-day lime consciousness in general is being aided by reason of its importance in meeting certain specific needs. For instance, vegetative cover plays an important part in checking erosion, which in itself is a tremendous problem in the South. Checking and ultimately preventing erosion is a "must" for Southern agriculture. Lime, along with phosphatic materials, generally is necessary for a desirable growth of vegetative cover. Nitrogen through legumes is possible only where soil is properly conditioned, and nitrogen is one of the big immediate needs for crop production in the Southeast. The scarcity of labor, the scarcity and the high cost of producing concentrates, the possibility of substituting more forage for concentrates, all are pointers to an increased lime use for the increased production of forage crops. A further fact sometimes subject to debate is the evident trend from row crops to a type of agriculture where permanent cover will occupy more and more acreage, especially in the Southeast. Finally, the problem of human and animal nutrition is beginning to relate itself to the lack of lime and other minerals in the soil.

These are some of the channels along which there has grown an increasing demand for the use of agricultural limestone. There are others no doubt, but these problems may be considered among the basic ones.

Some effort has been devoted to summarizing the need of limestone in actual tonnage figures. For example, the South Carolina Extension Service in its Circular 218, July 1942, states, "Over 80 per cent. of the crop land and pastures in South Carolina is too acid to grow legumes and legume and grass mixture successfully, and because we are using insufficient lime materials our soil is becoming more acid every year. In order to correct this acidity it will be necessary for South Carolina farmers to use approximately 1,600,000 tons of limestone annually."

The Southern Region of the Agricultural Adjustment Agency includes the States of Alabama, Arkansas, Florida, Georgia, Mississippi, Louisiana, Oklahoma, South Carolina and Texas. The Conservation Programs Branch, War Food Administration, Department of Agriculture, has tentatively arrived at lime needs on farms in seven of these states—Florida and Texas are not included. These needs will approximate 7,500,000 tons.

These data are based on informa-

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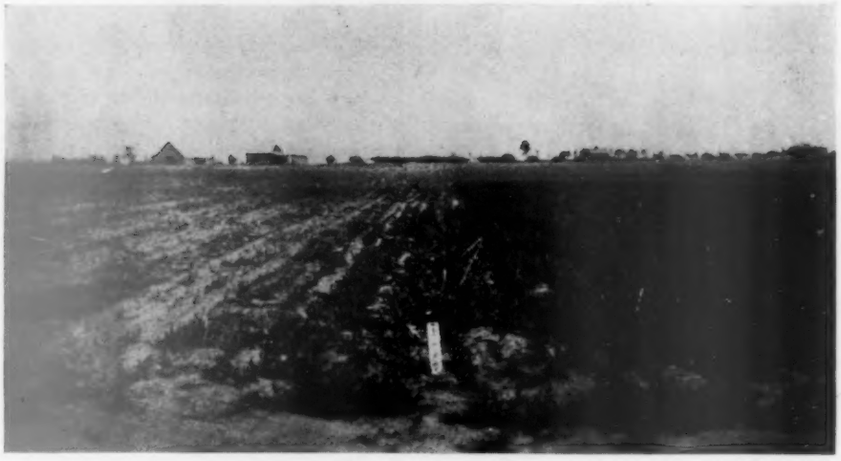
COMPLETE FERTILIZER LIMED



Effect of liming on Austrian winter peas. No lime on left; limed at right. (Courtesy South Carolina Experiment Station.)

tion furnished by state agronomists and represent estimates of annual requirements for an initial application for satisfactory crop and pasture production.

Announcements of the returns from the use of land are increasingly more pointed. For instance, in central and eastern Oklahoma, lime on a cost basis of 50 cents per acre per annum is reported as increasing the acre yield of alfalfa 600 pounds. In certain sections of Alabama it is stated that lime pays three for one in increased cotton yields.

Beginning in 1936 the Agricultural Conservation Program of the Department of Agriculture included the use of limestone as a practice for which payment would be made. While other practices may have been emphasized or promoted to a greater degree, at the same time the use of agricultural limestone was given more attention than ever before. In some cases in the years immediately following 1936 practice payment rates were made even more attractive. Despite these efforts, however, the expansion in use by the third year, which was 1938, was by no means gratifying. Performance summaries for the Program Year 1938 indicated that within the Southern Region the use of agricultural limestone totalled only 32,000 tons.

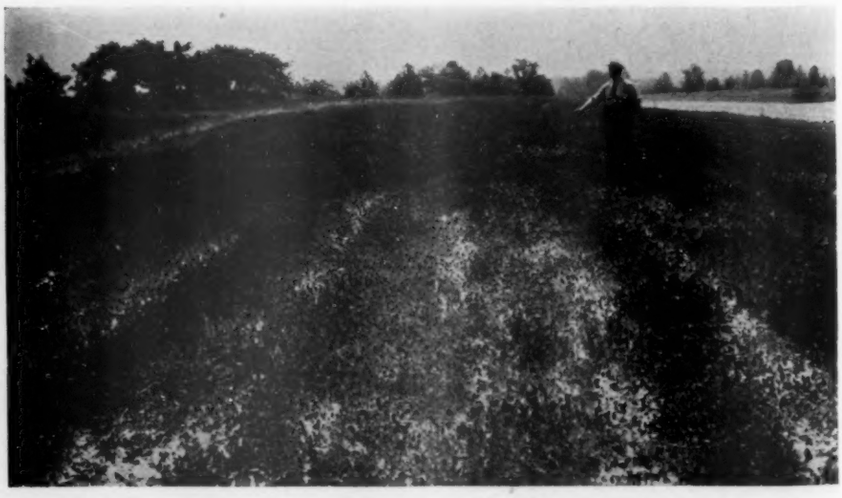
It was obvious that other steps had to be undertaken if the objectives of leading farmers, committeemen, and professional workers were to be attained. In 1939 the Southern Division of the AAA undertook the furnishing of agricultural limestone as a grant of aid, or conservation material as it is now known. This undertaking simply consists of procurement by the government of the materials, which, after advancing them to the farmer, collects later for the cost of their use by making deductions from payments made under the Agricultural Conservation Program.

Even though considerable effort was made in circularizing all possible sources of material, there resulted for that year the setting up under contract of only nine sources of supply. Of these only three comparatively small ones were engaged only or directly in the production of agricultural limestone. The other six sources were able to offer agricultural limestone as a by-product. One of these by-product sources was located outside the Southern Region. This illustration is given in order to point out that it actually has been necessary, in the promotion of a liming program in the South, to aid in the development of an industry at the same time. For the current program year the state offices within the Southern Region of the AAA have in effect contracts with 34 sources located within states of the region, and an additional eight sources located within states outside the Southern Region. A considerable number of these sources represent installations made or concerns set up within the last few years, while in other cases concerns principally engaged in other activities within the same general field have added the production of agricultural limestone to their operations.

It should be noted that a great many of these sources are experiencing a constant increase in the sales of limestone directly to farmers or through regular trade channels. For instance, one rather large producer who is under contract with AAA reported that his cash sales in 1943 were 284 per cent. over the sales made in 1940. Other concerns not having any contracts with AAA are showing constant increases in business through cash sales to farmers.

During this time continuous attention has been given to the use of by-product liming material, such as basic and calcium-silicate slag, tailings, acceptable screenings of road or ballast material, and paper-mill sludge. For instance, only recently work started in the movement of 100,000 tons of tailings which meet specifications, and which resulted from washing limestone used in the steel industry.

This increased number of sources, however, by no means represents a complete solution of the production or source problem. In the first place the current demand greatly exceeds any possibility of filling all the requests which have been and will be



Lime versus no lime under crimson clover in South Carolina. Check plot in foreground has had no lime. (Courtesy South Carolina Extension Service.)

ANALYSIS OF LIMESTONE REQUESTS PLACED AS TO SOURCE, LOCATION AND LENGTH OF HAUL IN THE SOUTHERN REGION, AAA DECEMBER 1, 1943 TO MARCH 31, 1944

State	Total Tonnage	Sources Within State			All Other Sources			
		Tons	% of Total	Average Haul*	Tons	States Wherein Source Located	% of Total	Average Haul*
Alabama	71,233	68,060	95.50	105	3,173	Tennessee	4.50	96
Arkansas	38,150	28,090	73.60	41	520	Louisiana	1.40	92
					9,540	Missouri	25.00	64
Florida	717	717	100.00	117				
Georgia	68,231	67,901	98.30	67	1,040	Alabama	1.55	58
					100	South Carolina	0.15	160
Louisiana	89,459	23,494	39.20	199	2,775	Missouri	3.10	354
					51,443	Alabama	57.70	395
Mississippi	443,827	72,383	16.30	17	133,539	Alabama	30.10	186
					25,347	Kentucky	5.70	279
					180,678	Missouri	40.70	323
					31,880	Tennessee	7.20	241
Oklahoma	83,403	66,481	79.70	22	12,708	Arkansas	15.20	71
					4,214	Missouri	5.10	120
South Carolina	196,112	113,804	58.03	23	15,695	Alabama	8.00	381
					21,830	Georgia	11.13	159
					50	Tennessee	0.03	180
					44,733	Virginia	22.81	265
Texas	325	325	100.00	129				

*Expressed in approximate average air-line miles; the actual railway mileage will vary from 1.2 to 1.5 times each such entry.

made before the expiration of the current program year. Furthermore, as will be noted in the accompanying table, a ton of limestone used on the average farm in the Southern Region has to undergo a very long haul.

The railway-transportation cost on considerable portions of the tonnage moved into some of our states exceeds by far the initial cost of the material.

The location of the existing sources of agricultural limestone by no means reflects fully the existence or appearance of deposits of materials. With the exception of a few areas throughout the Southern Region, there are acceptable deposits of one or another type of limestone within 100 miles of almost any farm needing the material.

In addition to the encouragement which has been given toward setting up new producing facilities, effort has also been directed toward the development of plans or methods which would aid in the general promotion of the liming program. In other words, the past few years have largely been a period of plan or pattern making.

It is realized that because of the fact that limestone is a bulky and unhandy material to handle considerable attention has been devoted to installing farmyard delivery arrangements. In addition to such a plan being more economical in the end, and an aid in overcoming inertia or use resistance, it has been shown that usually once an active farmyard delivery plan is set up there is incidentally acquired one of the best promotional mediums. There have been cases where the total demand within a county amounted to only a few hundred tons to begin with, but as soon as a well-organized trucking crew began to deliver the material the interest and demand would rise very rapidly. Sometimes this has resulted in the delivery of several thousand tons within the same territory prior to the time the fleet of trucks moved to another center.

During the current season our state offices have farmyard delivery contracts with a total of 106 trucking concerns who obtain their materials directly from the most practical source. Some manufacturers themselves operate fleets of trucks in making farmyard delivery. One operates about thirty trucks on this basis, having them grouped in units of about six trucks each. In addition the principle of farmyard delivery is followed in a number of other cases where the material is delivered to the railhead by the AAA. This is done by drayage agreements entered into between County Agricultural Conservation Associations and local drayage concerns. At the present time lime is being delivered in this way under these arrangements with 114 different drayage concerns.

It is anticipated that, as more trucking equipment becomes available and the labor situation improves, there will be a tremendous increase in the use of farmyard delivery, provided adequate limestone can be crushed. Counties now having no lime programs, or small ones, will naturally become active. Facilities for spreading are improving, and spreading, as a part of the farm-delivery job, is taking shape.

As a further indication of the present period being a formative or pattern-making one with regard to the liming program, it may be of interest to give an illustration. There are approximately 560 counties in the Southern Region lying within the humid area of the South. During the last six months of 1943 237 or 42 per cent. of these 560 counties used no limestone as a conservation material. We have no record of the tonnage which farmers bought on their own account within this same territory; however, it may be considered a small amount, if any at all in some counties. Usually cash sales of limestone occur only in areas wherein the Agricultural Conservation Program has an active liming program. During the period referred to of the remaining 323 counties 163 used less than 500 tons, 61 used from 500 to 1,000 tons, and only 89 counties used in excess of 1,000 tons each as conservation materials. Hence, it may be seen that much remains to be done.

On the other hand proper appraisal should be given to the rate of progress that is being made. The use of liming materials in 1938 approximated 32,000 tons. This amount increased to a total of approximately 480,000 tons in 1942, with an estimated use in excess of 600,000 tons for 1943. Use in 1943 would have been considerably greater if production and distribution facilities had been available.

It has been reliably stated that the use of limestone on farms throughout the Nation increased 13 times in 1942 over that used in 1933. We have no figures for Southern use in 1933, however the amount used in 1943 is approximately 20 times that used in 1938.

It is expected that, if materials are available, farmers of the South during 1944 will use in excess of 1,200,000 tons. In fact orders have already been placed with producers and suppliers in excess of 1,000,000 tons. No records are available as yet of the new territories in which farmers have become interested in the use of lime or have bought for cash.

It is recognized that there will be some disappointment from the use of

the material. Other farmers will have an exaggerated value of limestone. Much remains to be done in the way of experimentation. Soil testing on the individual farm is hardly well started. With it all, however, the job of production and distribution remains the major one.

The question has been asked: "Will the use of lime be maintained in the future?" My answer is that if agriculture continues as a major industry in the South, the use of limestone along with other needed minerals is here to stay.

AAA Outlook (*from page 68*)
spread on fields under the contract. In Illinois the greater part of the tonnage is delivered to farmers at the plant or railhead, and the farmers arrange for their own hauling and spreading. In view of the shortage of trucks, tires, and gasoline, a determined effort has been made by this region to have farmers provide for their own delivery from the plant or railhead.

The production problem does not appear at this time to be nearly as serious as the distribution phase of the program. The necessity of hiring older men and other inexperienced labor is the major problem in production. The critical shortage of trucks, tires, and experienced truck drivers appears to be the principal bottleneck in the over-all picture at the present time.

Southern Region This area, comprising the southern tier of states east of the Mississippi River and the four southernmost states directly west of the Mississippi, has been the slowest to take advantage of the inducements offered by AAA to expand limestone use. New interest is being shown in these states this year, however, leading to the belief that the estimated use may be considerably below the actual use. Currently it is necessary to bring substantial quantities south out of other producing states, Virginia, Kentucky, Tennessee, Illinois, and Missouri being chiefly involved as sources. Recognition by trade interests of the increased demand as well as sustained efforts on the part of AAA state and county committees will, it is considered, result in the development of local supplies in the course of the year.

[For a more detailed discussion of the situation in the Southern Region see Mr. Deal's article on page 69.—EDITOR.]

Western Region This region comprises the States of Kansas, North Dakota and the eleven states west of the line formed by extending a line southward from the west line of North Dakota. Limestone can be utilized, however, only in the soils of Oregon, Washington, and the humid area of Kansas. While slightly increased production from available sources should adequately supply the needs in Kansas, the usage in the States of Oregon and Washington is limited by available sources. This region relies upon railway movements to a large extent because of the truck, gasoline, and tire situation.

It is estimated that the minimum requirements of farms for 1944 will be about 22,000,000 tons, approximately 15,000,000 of which will be supplied through the AAA. We are providing farmers with every inducement to use limestone, whether carrying out AAA practices or purchasing for cash, and we are going to provide industry with every inducement to produce and distribute it.

Thermal Analysis of Clay Minerals

Publication of a Bureau of Mines research report on the thermal analysis of clay minerals and acid extraction of alumina from clays for aluminum has been announced. The report presents preliminary results of a coöperative investigation by Bureau engineers and personnel of the University of Washington College of Mines, Seattle. Started a number of years ago, the joint experiments have dealt with the high-alumina clay deposits of the West, and attention was confined chiefly to processes based on the use of sulfuric acid or sulphates.

The common clay minerals of major importance are classified as kaolinite, illite, and montmorillonite, and Bureau tests indicate that alumina can be extracted completely from certain minerals only, namely those of the kaolinite type. Thus, determination of the mineral composition of a clay sample is of primary importance in the use of acid extraction methods in the recovery of alumina.

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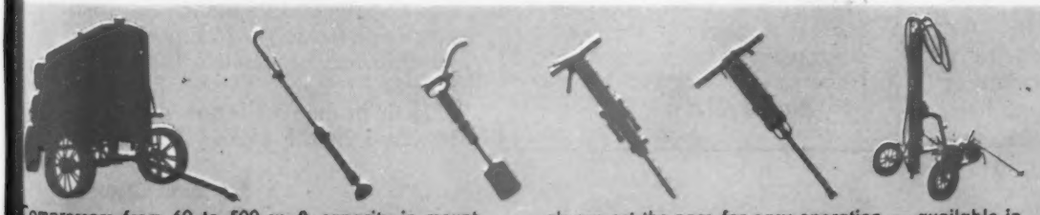

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T IN BINDING

Major Improvement Program at Gager Lime Plant Is Nearing Completion

General view of the Gager Lime Manufacturing Company plant at Sherwood, Tennessee. Mine is at upper left.

another ON THE SPOT report

THE writer recently visited the plant of the Gager Lime Manufacturing Company at Sherwood, Tennessee, for the first time in several years and found a number of recent improvements and changes of practice which should be of interest to other lime, crushed-stone and agricultural-limestone producers. Of special interest are a very unusual method of underground mining, an efficient grinding department, a modern system of vertical-kiln feeding and operation, and other features. The history of the company and plant and its development during more than 40 years of operation are worth an article in themselves.

The company was formed in 1892 by Byron Gager. The original two

By W. E. TRAUFFER

wood-fired shaft kilns were supplied from an open quarry at the present mine level. Expansion was gradual until the outbreak of World War I. Then a hydrating department was added and two rotary kilns were installed to supplant the shaft kilns then in operation. The rotaries were originally fired with coal-tar pitch but in 1926 two Chapman gas producers were installed to fire these and the 16 small shaft kilns then in use. In 1938 four large shaft kilns were added and these are also gas-fired. In 1938 one was converted to the Azbe center-burner system and in 1943 the other three were converted to a 2-level or double-burner system of original design. In 1944 a belt-conveyor kiln-charging system was installed for these four kilns and an hourly charging and drawing schedule was adopted which considerably improved their fuel ratios and doubled their capacity to 35 tons per day each. Provisions were made at the same time to feed CO_2 gas from these kilns to the gas producers. In 1940 these kilns were equipped with hoods and draft fans.

A new Wellman Type SB10 gas producer now on order will have a capacity of 60 tons of coal in 24 hours. A 300-ton coal-storage bin will be installed and a pan-conveyor will feed the lime from the four large kilns to a 350-ton bin. This conveyor will be so arranged that cores can be picked out and loaded into Dempster Dumpster buckets and sent through the agstone circuit. In 1942 pulverizers were installed to make ordnance stone for explosives plants. These now produce agstone at the rate of 50 tons per hour.

By 1927 the overburden had become so heavy that a mine was opened. Natural horizontal cleavage planes in the deposit make underground mining both safe and economical. Mine cars were used until 1941, when trucks were adopted in the main mine level. In 1942 a shovel replaced hand loading. During the life of this plant mules had given way to steam locomotives and these in turn to gasoline locomotives for car haulage. The small amount of shale in the rock is now picked out by hand in the plant. The use of

F. E. Nabers

● After serving the Gager Lime Manufacturing Company as vice-president and general manager for the last four years, Frank E. Nabers has resigned to accept the position of vice-president in charge of engineering of the Southern Ferro Alloys Company of Chattanooga During Mr. Nabers regime at Gager many important changes were made as described in the accompanying article. These improvements resulted in a substantial reduction in labor requirements and greatly increased kiln production.

Frank M. Ferguson, Chattanooga, has been appointed general manager of the Gager company to succeed Mr. Nabers. He assumed his new position May 1.

View of the mine face showing 3 of the 7 openings.

gasoline locomotives, trucks and shovels in the mine is made possible by an adequate arrangement of ventilating openings.

In 1938 a Dempster Dumpster was purchased for use in the mine and later a second Dumpster was added. When, in 1940, a new mine was opened at a lower level to work a ledge of oölitic limestone for special products, now chiefly lime for glass, these Dumpsters were assigned to this service.

The original crushing and screening plant at mine level is still in use but it merely supplements the production of stone from the newer plant at a lower level. A 1,400-foot tramcar system which at one time carried all the stone from the quarry or mine level to the kilns 800 feet below now carries kiln-size stone from the old plant to the 12 remaining small shaft kilns. It can also feed stone direct to railroad cars for shipment. This is a 3-rail balanced-type tramway with a passing "Y" and 36-inch gage track. The Dempster Dumpsters can discharge into the 3-cubic yard tramcars at mine level and are also used to haul stone downhill to the other four small kilns. The above-mentioned 12 kilns and the tramway system are to be abandoned soon.

Magnetic pulley on main conveyor.

Truck discharging to primary crusher hopper. Stock pile is at the left.

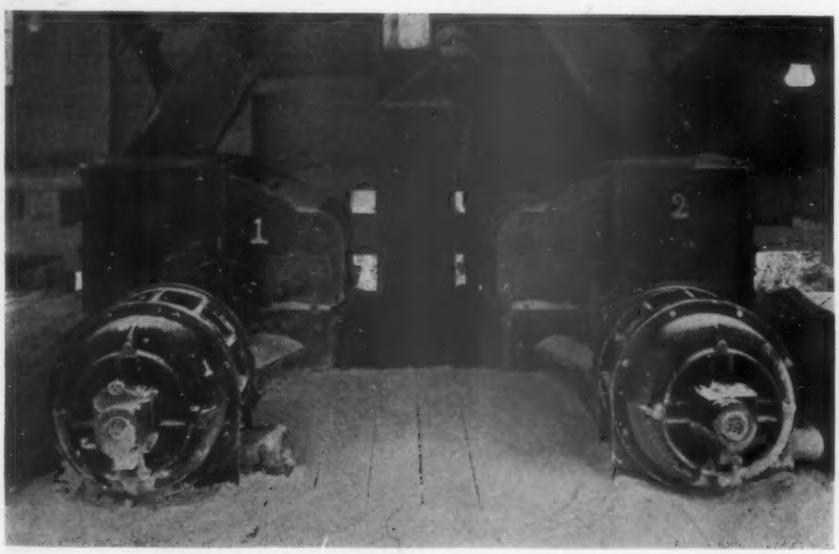
The deposit in which the main mine is located is a limestone containing 97 per cent. $CaCO_3$. It is estimated that there is a 7,000-year reserve of material in the 5,000-acre property at the present rate of production. To date only 25 acres have been worked out. The stone lies horizontally in three 20-foot ledges which are separated by thin layers of shale. Originally only the bottom ledge was worked by the room-and-pillar method. Later a ramp was cut to the upper ledge which is drifted. Beginning in 1940 the center level was benched down to form rooms 60 feet high. At the same time column drills were replaced by wagon drills. Detachable drill bits of Ingersoll-Rand and Timken manufacture were then adopted and these make it possible for the 2 wagon drills to do more work than the 5 old column drills. Standard drilling and blasting practice is followed.

Electric vibrating feeder which feeds kiln stone to conveyor.

The mine now covers an area extending 1,500 feet into the hill and 2,000 feet wide. It has 30-foot-square pillars and 40-foot rooms. There are 7 front openings, and cross-ventilating tunnels are being opened every 500 feet.

The stone in this mine is loaded by a 331 Marion electric shovel of standard design which is equipped with a 1-cubic yard dipper. This loads into a 10-cubic yard Truck Engineering Company end-dump trailer attached to a Mack power unit and into 2 Mack 8-cubic yard end-dump trucks. A ½-cubic yard Hough tractor-mounted loader is also used to load into 1½-ton Chevrolet trucks. This tractor can also be equipped with a bulldozer to maintain the roads in the mines and elsewhere.

These trucks discharge the stone for the crushing plant into a 25-ton hopper at the edge of the quarry level. A feeder made from two tractor tracks, and driven by a variable-speed motor, feeds the stone into the 24- by 36-inch Allis-Chalmers primary jaw crusher. The minus-12-inch product of this crusher is car-



Limestone pulverizers direct connected to 100-horsepower motors.

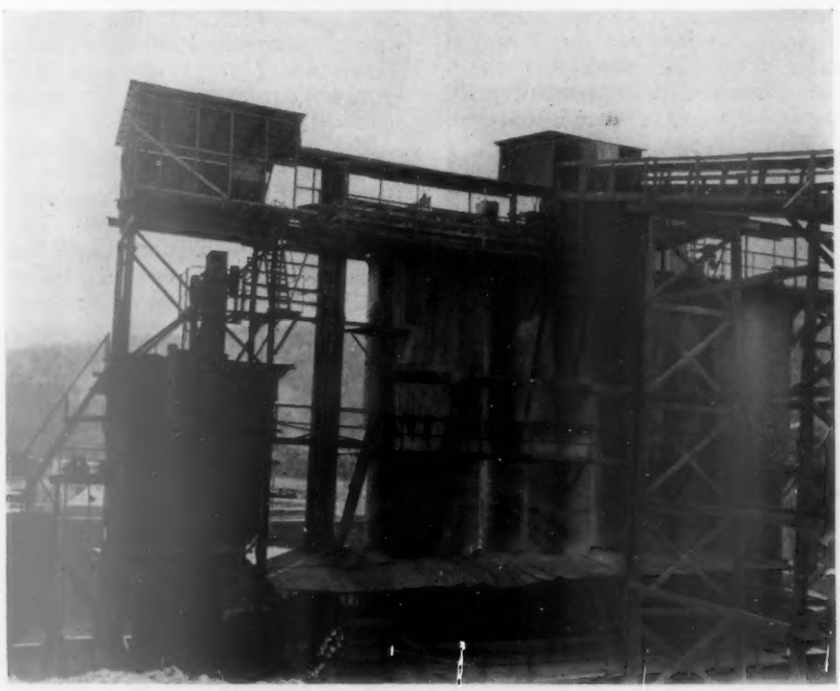
Truck discharging stone direct to kiln.

Electric shovel loading 15-ton semi-trailer truck in the mine.

ried on a 36-inch by 150-foot belt-conveyor to the 5- by 14-foot Tyler Ty-Rock 2-deck scalping screen. This has a 4-inch-square-opening top deck consisting of manganese-steel bars ¾-inch wide and 1¼-inch thick. Wire cloth is used on the bottom deck and this is varied from ½- to 1½-inch opening as desired.

The plus-4-inch oversize from this screen is feed for the four large shaft kilns and goes to a bin from which it is hauled downhill by trucks. A 36-inch by 750-foot belt-conveyor with a drop of 200 feet will be installed for this purpose with a regenerative motor for a brake. The 4-inch-down second size is crushed and screened to make any desired product from road rock, ballast and rotary-kiln feed down to agstone. The third screen product is similarly used. Both these smaller sizes are discharged together on a storage pile over a reclaiming belt-conveyor. This pile has a live-storage capacity of 1,800 tons.

A feature of this screening and storage structure is the floating roof which covers it and supports the screen and the discharge end of the conveyor. This structure rests on wooden beams set in the storage pile at a point a few feet below the level at which the inner withdrawal cone intersects the outer cone of the stock pile. This type of construction eliminates the stresses and shifting to which the structure would be subjected if its supporting pillars extended through the pile to ground level.



The four large vertical kilns. The one at left has center burner, the others 2-level burners.

The minus-4-inch stone is reclaimed from the stock pile by a Jeffrey-Traylor vibrating feeder to a belt-conveyor. This has a Stearns 28-inch-wide by 24-inch-diameter magnetic head pulley which removes tramp iron ahead of the reduction crushers. A selective chute controls the flow of the rock to an Austin gyratory crusher and two Williams NF 30 overrunning hammer-mills. The latter are driven at 1,800 r.p.m. by 100-horsepower direct-connected electric motors. A common bucket-elevator carries the products of these crushers to a 4- by 10-foot 3-deck Ty-Rock screen and two 4- by 10-foot single-deck Tyler Hummer screens which make any desired-fine sizes. These products are trucked down hill to the railroad.

This entire plant is built downhill and takes advantage of gravity. The final truck-loading bin is 200 feet below the mine level from which the trucks feed the primary crusher. This layout also makes more storage capacity available than would otherwise be possible. One man controls the operation of the entire plant.

At the lime plant the stone for the four large kilns is dumped from the trucks into a 400-ton bin which will later be fed by the downhill conveyor previously mentioned. A special 36-inch-wide Syntron electric vibrating feeder discharges the stone at the rate of 300 tons per hour on an inclined belt-conveyor to the top of the kilns. In order to prevent the heavy load of stone in the bin from

(*Continued on page* 78)

General view of the Blue Grass Stone Company plant. Spreader truck is just leaving agricultural-stone loading bin.

LIMESTONE FOR THE BLUE GRASS

Lexington Plant Supplies Thousands of Tons Annually to Kentucky's Famous Horse Farms

another ON THE SPOT report

LEXINGTON, Kentucky, is in the heart of the "blue grass region." Within a 10-mile radius of the city, on thousands of rolling acres of lush pastures, many of the famous race horses of the past half century have been bred, reared and trained. Whirlaway, track sensation of recent years, is stabled at Calumet Farms just west of the city. A few miles to the north, on Faraway Farms, 27-year-old Man O' War, greatest racing horse of all time, is growing old gracefully in the company of two of his illustrious sons, War Admiral and War Relic, in their private stable and pasture.

The blue grass is kept rich and succulent by the regular application of ample quantities of agricultural limestone. One of the quarry plants in this area which specializes in the production and spreading of this material is the Blue Grass Stone Company. This concern, established about eight years ago on a 20-acre deposit just north of Lexington by Henderson Hostetter, has two separate plants—one for the production of commercial aggregate and road stone, the other producing agricultural limestone exclusively Early spring and late fall are its busiest seasons for these are the ideal times for applying the pulverized stone to the grass lands since the rather delicate turf has a tendency to "burn" if the stone is spread in hot weather.

Dump trucks haul the stone from the quarry to the aggregates plant, discharging their loads into a Telsmith 10A primary crusher, an elevator carrying the crushed product up to a 16-foot by 48-inch, 4-section revolving screen which does the scalping as well as all the sizing. Material 1½ to 3½ inches in size is chuted to a Telsmith 2-foot cone crusher for secondary breakage, the small amount of plus-3½-inch stone being rejected. This reduction crusher is in closed circuit with the screen and is a recent addition to the plant, having supplanted a pair of rolls which were formerly used. The various sizes of stone drop into the proper truck-loading bins below the screen. None of the material is washed.

Since the demand for road stone, concrete aggregate, and agricultural stone varies a great deal, Mr. Hostetter decided to erect the agricultural-stone plant as a separate and complete unit when it was built a few years ago. It is located about 300 feet hauling distance from the primary plant and the feed consists of 1½-inch and smaller material withdrawn from the aggregate bins previously mentioned or from open storage and carried by dump trucks. These discharge the stone into a receiving hopper which feeds it to a

By HARRY F. UTLEY

slowly-moving 16-inch by 30-foot belt-conveyor which serves as both conveyor and feeder. The belt discharges the stone into an Eagle 15-ton per hour swing-hammer mill. This unit pulverizes the stone to extreme fineness, the hammers being set for the close clearance of ⅛ inch and checked frequently to assure a product fine enough to meet or exceed A.A.A. specifications. The mill product is elevated to a 150-ton

One of the two 85-horsepower Diesel engines which power the operations.

truck-loading bin equipped with three hand-operated sliding gates.

The company owns two Baughman self-feeding limestone spreaders mounted permanently on International trucks. A large portion of the agstone output is sold this way, being spread directly on the land by the company's drivers. Until a few months ago the ceiling price for agricultural limestone in the Lexington area was $1.00 per ton but this

Hammer-mill which makes the agricultural stone. It is belt-driven by one of the Diesel engines.

was too low to allow a profit and the O.P.A. granted a 25-per cent. increase following an appeal for price relief by the producers. Thus the present ceiling is $1.25 f.o.b. plant. Delivered prices are $2.15 within Fayette County and $2.40 in adjoining Scott County. The charge for spreading is 40 cents per ton additional on blue-grass pastures and 50 cents on "soft" ground, tobacco land, etc.

Each of the plants is separately driven by a Cummins Model H 85-horsepower Diesel engine. Shipments are weighed on a truck scale. A short while ago Mr. Hostetter, experiencing some difficulty with the scale, discovered that the trouble was being caused by fine stone dropping off the sides of trucks into the small openings between the edges of the scale platform and the frame, disturbing the delicate balance of the lever mechanism in the pit below. He solved the problem by tacking strips of discarded 8-inch composition transmission belting over the openings on all four sides of the platform, a "wrinkle" that may be helpful to other operators.

The commercial-stone plant showing the new 2-foot reduction crusher.

Gager *(from page 76)*

dampening the feeder vibration the steel hopper under the bin is designed so that the dead weight is taken by it. This hopper tapers from the 24-foot bin width to a 4- by 7-foot opening and the plate on one side extends to a point directly under the end of the other side. A horizontal sliding gate at this opening is adjusted to a width which prevents either flooding or jamming and will not be moved except in an emergency. The 36-inch by 190-foot inclined reclaiming belt-conveyor discharges on a 36-inch by 40-foot reversible shuttle belt-conveyor which runs on rails on top of the four large kilns. This feeds three of the kilns. The stone is discharged from the conveyor against a baffle box so arranged that when it is lifted out of the way the stone is discharged directly into the fourth kiln. Both conveyors are electrically interconnected to stop and start simultaneously and, with the feeder, are controlled from the top of the kilns.

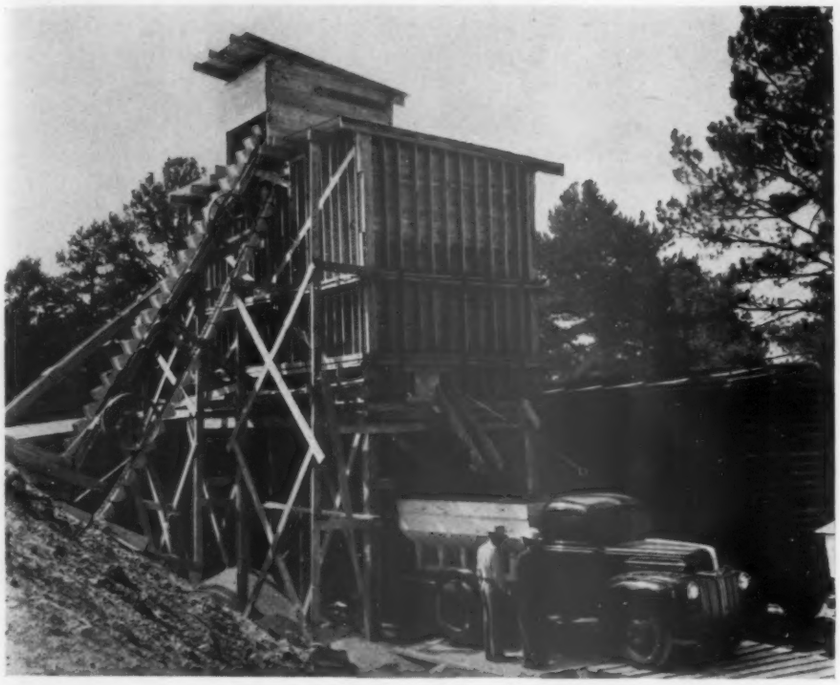
The 2-level burner system used in three of these kilns is believed to be practical only with a constant feed of cold rock into the kilns as is the case here.

The oolitic limestone mine is 50 feet below the level of the other mine. It is worked in a 16-foot level of rock containing 98.5 per cent. $CaCO_3$. This mine is ventilated through vertical shafts or chimneys into the upper mine. Six-man crews load stone by hand into the 3-cubic yard buckets of the two Dempster Dumpsters which are mounted on Mack truck chassis. Some of this stone is pulverized for use in glass manufacture and the lime made from it is used in paper mills.

The daily output of this plant includes 200 tons of quicklime, 50 to 60 tons of hydrate, 200 tons of agstone and 100 tons of crushed stone. The production in recent years has averaged 300,000 tons annually.

The officers of the company are: C. B. Gager, president; Frank E. Nabers, Jr., vice-president and general manager; Condit D. Brown, secretary; Thomas E. Satterfield, treasurer. Robert B. Gatewood is plant superintendent.

Louisiana Crop Lands Benefit from State-Sponsored Pulverizing Plant



This close-up view of the plant shows one of the fleet of spreader trucks being loaded.

By W. E. TRAUFFER

another ON THE SPOT report

LOUISIANA is one of a number of states which have vast acreages of potentially-productive land which needs only the application of agricultural limestone and phosphate to take it out of the marginal classification. Farmers had long contended with acid or "sour" soil but few knew what to do about it, or could afford to buy agstone shipped in at high cost from neighboring states if they did. Only after agriculturalists at the state experiment station proved that this soil condition could be overcome by the application of these materials were definite steps taken to make agstone available at a reasonable price from local sources.

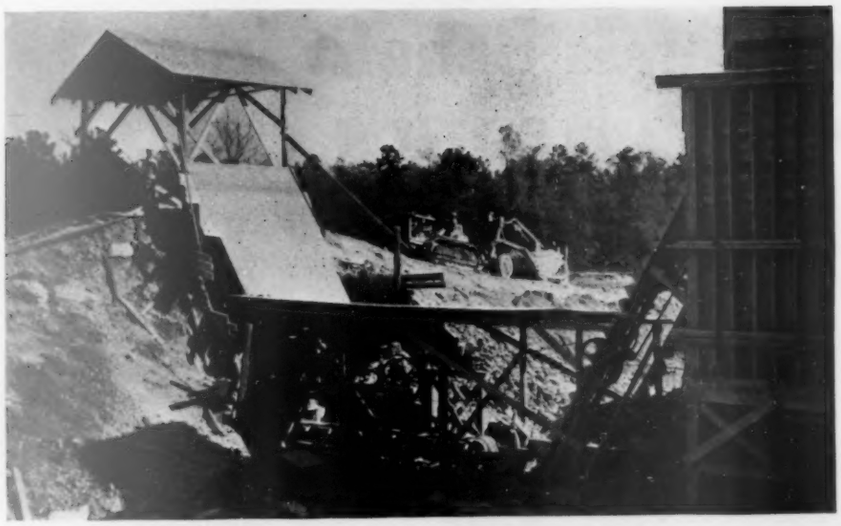
The first concrete steps in this direction were taken when Governor Sam Jones became personally interested in this problem and had the state geological department, under Dr. W. R. Huhner, make a search for a suitable deposit. When this was located at Rayburn Dome, near New Friendship, 60 miles southeast of Shreveport, he induced W. H. Johnson, a leading industrialist of that city, to form a company to produce and market this material. Thus was born the Louisiana Limestone Company which has its offices in Shreveport. W. H. Johnson is owner of the company and Horace T. Long is general manager.

Mr. Long's first step was to determine the potential demand for agstone in northern and central Louisiana. Through county agents and other sources it was determined that a market existed for at least 20,000 tons of this material annually. With this figure in mind he designed a small plant with a capacity of 12 tons per hour and obtained WPB approval to build it. This plant went into operation on October 12, 1943, and the dedication ceremonies were attended by Governor Jones, other state dignitaries, county and government agents, agricultural leaders, and others interested in this development.

When the availability of low-cost agstone became generally known the demand for it soared far above expectations and within two months after the plant went in operation there was a backlog of unfilled orders totaling over 100,000 tons. Parishes—counties in other states—which expected to use 1,000 tons annually now want five to ten times that amount. It soon became evident that 200,000 tons of agricultural limestone could be sold in the next year if it could be produced. Plans were made immediately for the enlargement of this plant to four times its original capacity, or 48 tons per hour, and this work was completed early in January, 1944. A new hammer-mill replaced the original small machine and other minor changes were made. Further plant expansions which are planned will soon double the present capacity. A large storage shed is to be built so that a stock pile of finished material built up during slack periods can help fill the demand in rush seasons.

Even before the first plant was built Mr. Long realized that an adequate and economical system for the application of the agstone to the soil was a key point in the program. The successful solution of this problem is given much of the credit for the success of the entire program. Before any steps were taken in this direction Mr. Long visited several of the midwestern and southern

Plant view showing tractor and scraper leaving hopper ramp after discharging a load of rock.



The hammer-mill is located beneath the receiving hopper at left, the elevator at right carrying the crushed material to the bins.

states where agstone is widely used and observed the methods and equipment in use. As a result of his observations it was decided that the conditions peculiar to this nearly virginal market called for an overall liming service which would keep in the hands of the company general control of distribution.

Under this arrangement county agents and others book the sales. Local hauling contractors are assigned specific territories and make the deliveries with their own trucks on which are mounted 5-ton Baughman mechanical spreader-bodies furnished by the company. In this

Drillers at work in the quarry.

way the trucks can be used for other hauling during periods of low demand. A few of these haulers make deliveries from the plant to points within a 35-mile radius. Most of the output, however, is shipped in railroad cars to any desired points in the haulers' territories and the truck deliveries are made from those points. This system keeps the hauling and spreading cost at the absolute minimum.

When this system was inaugurated 8 spreader-bodies were allotted to the most important territories. More were added as the demand and the capacity of the plant increased. Now the company has in operation throughout Louisiana 42 spreaders mounted on Chevrolet, Ford and

Governor Sam Jones (facing camera) and state officials watch operation of a spreader at time plant was dedicated.

International trucks and to the distributing points varies but expects to have 100 in operation by the end of 1944. Deliveries are being made regularly to all parts of the state and even into southern Arkansas, to points as distant as 250 miles.

The product is sold for $1.25 per ton at the plant. The freight rate averages about $1.25 per ton. The hauling contractors get an average of $2.00 per ton for delivering and distributing the agstone, usually within a 15-mile radius from the railroad siding.

The deposit found by Dr. Huhner and his assistants is an up-ended stratum having a thickness of approximately 200 feet and an unknown depth and completely encircling the salt dome known as Rayburn Dome. This particular salt dome lies much closer to the surface than many of the other salt domes in the state and this apparently explains why the up-ended formation produced by the upheaving which formed the salt dome outcropped at the surface close to the center of the dome. Nowhere is the surface of this deposit more than 6 feet below the ground surface. By exploration with a bulldozer it has been proved that the 11-acre tract leased by the company on a royalty basis from the owner, the Southern Advance Bag & Paper Company, contains more than

Tractor and scraper at work in quarry.

2,000,000 tons of stone within 50 feet of the surface.

In places the stone has weathered to the consistency of marl and this material is excavated only in dry weather. The solid stone can be excavated at any time. The small amount of drilling necessary is done with Ingersoll-Rand jackhammers for which air is supplied by portable compressors—a Chicago Pneumatic 160-c.f.m. and a Davey 100-c.f.m. Hercules 40-per cent. dynamite is used. The stone is loaded and hauled to the plant by a 7½-cubic yard Le Tourneau Carryall scraper which is pulled by a Caterpillar D7 tractor. The scraper has special digging teeth of original design which act as rippers. At the plant the material is discharged from an earthen ramp into a hopper over the new Number 30-40 Williams patented non-clog hammer-mill. A Williams reciprocating-plate feeder is used. A Columbus Conveyor Company chain-bucket elevator carries the crushed material to the top of a 200-ton elevated track bin. Trucks are loaded under the bin and a loader is used for the box cars.

At present the hammer-mill and elevator are driven by a Caterpillar D 13000 Diesel engine but electric power will soon be available. The WPB has authorized the Louisiana Light & Power Company to build the necessary 9-mile power-transmission line to the plant.

R. S. Hudson, minister of agriculture and fisheries (right) and E. W. Towler, Cawood Wharton president, with group at quarry face at the ceremonies which started the new plant.

Dignitaries Grace Opening of Newest British Agstone Plant

ENGLAND in war-time is a country all-out for victory, on the farm as well as the industrial front. A number of new agricultural-limestone plants have been built and placed in operation recently to assure bumper crops from all available acreage.

Cawood Wharton & Company, Ltd., quarry operators, recently established a plant known as its Holton Agricultural Limestone Works near Oxford and its opening was marked by the attendance of a group of notables headed by the Rt. Hon. R. S. Hudson, Member of Parliament and Minister of Agriculture and Fisheries. The heart of the new plant is a Bradley Junior Hercules mill, supplied by the Bradley Pulverizer Company, Allentown, Pennsylvania, under Lend-Lease.

The new Holton plant, as described by W. J. Fackerell, London representative, operates as follows:

"The first stage of production is at the quarry face where the stone is drilled, blasted and broken down to approximately 8-inch pieces. This material is fed to the plant by way of an inclined chute leading to a Thomas & Foster granulator crusher which reduces it to 1-inch size and under in one process. Thence, by continuous bucket-elevator, the material is delivered to a Bristowe oil-fired cylindrical drier. This unit is followed by a reciprocating cooler tray where the dried stone is subjected to a blast of cold air to reduce the temperature.

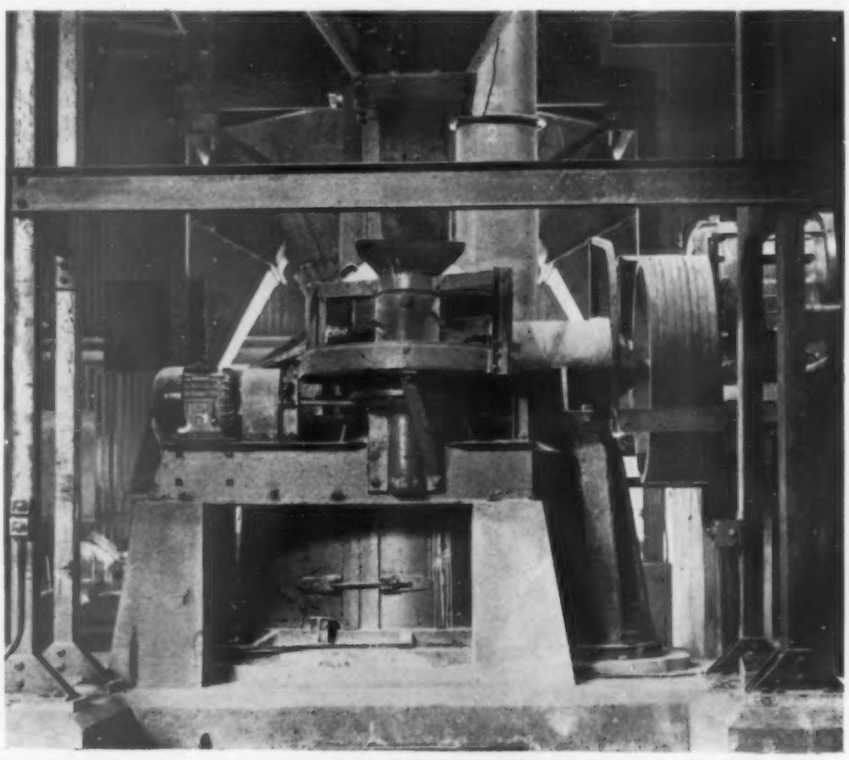
"The cooled stone is then taken by a second elevator to the feed hopper over the Bradley Junior Hercules mill. It is one of the first of these large-capacity pulverizers to be installed in Britain, although many are successfully operating in America. Grinding to agricultural fineness, this mill produces 10 to 12 tons per hour.

"The ground material is discharged through a screen fitted around the mill-grinding chamber whence it falls through ports in the outer periphery of the mill base into a conical chamber cast in the concrete foundations immediately below the mill.

"The mill drive is by V-belt from a 100-horsepower motor. A separate 1½-horsepower motor drives the mill feeder. These motors are interconnected through an automatic control panel whereby the mill load controls the feeder motor. Thus, when the mill is overloaded, the feeder is cut-out and *vice versa*. This automatically insures continuous full load production.

"A horizontal screw conveyor delivers the ground limestone from under the mill to a third elevator discharging into the final ground storage hopper. The latter is designed to insure rapid discharge for either bagging or bulk supplies.

"Two automatic sack-filling machines fitted on either side of the



Rear view of the pulverizer in the Holton plant showing feeder.

storage hopper are each capable of bagging 10 to 12 tons per hour into 112-pound paper sacks. The latter are made with self-sealing valves.

"The consequent elimination of sack-ties and bag ears avoids wastage which such arrangement involves. The 112-pound paper valve bags are easily handled and readily stowed and, with average care, loss through damaged sacks is negligible.

"Sack-filling machines were supplied by Sack Fillers, Ltd., London, with weighing machines by W. & T. Avery, Birmingham.

"A well-arranged ramp leads into the loading dock at the despatch end of the main building and, for bulk-loading, the lorries are backed immediately under the storage hopper from which bulk supplies are discharged by special non-choke large size gate valve. Thus, both bag and bulk deliveries can be expeditiously handled.

"The complete installation, in spite of its large capacity, is most compact, but nevertheless well arranged with good spacing around the equipment to give liberal accessibility everywhere. This ensures efficient continuity of operation with the minimum of labor."

Waste Sludge Yields Lime

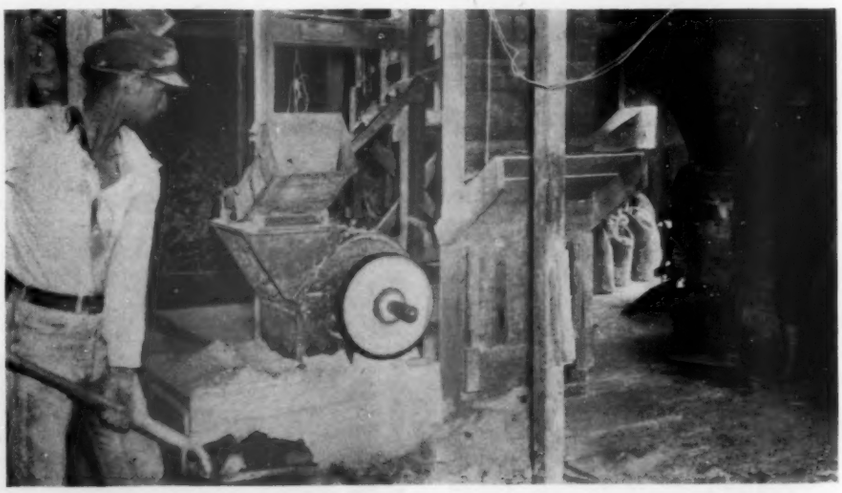
another ON THE SPOT report

IN an industrial area in the southern part of Seattle, Washington, is the small plant of the Seattle Lime Company which makes hydrated lime from the waste sludge of an oxy-acetylene plant nearby. When the plant was built in 1934 the entire output was used for liming soil. Later some of the lime was sold for building work outside Seattle and in the last few years the plant has been kept busy supplying the needs of war construction projects in this area. The original 1-ton per hour capacity of the plant was doubled when the acetylene plant was enlarged and more sludge was made available.

The oxy-acetylene plant hydrates calcium carbide which is shipped from Keokuk, Iowa. The gas is compressed and bottled in steel cylinders. The waste sludge remaining after this operation is almost a perfect lime putty, analyzing 98 per cent. $CaOH_2$ and 1 per cent. free carbon with traces of aluminum oxide, magnesium and sulphur. This sludge is dumped into outdoor pits where it drains off to a 40 to 60 per cent. moisture content.

When drained this sludge is loaded into a truck and is discharged at the lime plant into a 4½- by 32-foot Hardinge Ruggles-Coles rotary drier which is fired with oil by a No. 5 Ray burner. This dries the sludge and recalcines carbonated particles. Later a drum filter will be used ahead of the drier to bring the moisture content down to about 30 per cent. This will increase the capacity of the drier and lower production costs. The draft for the drier is supplied by a fan which is equipped with sprays to settle the exhausted dust.

The product of the drier is a coarse hydrated lime, which is elevated to a Gruendler hammer-mill to be reduced to the desired fineness. Another bucket-elevator carries the finished hydrate to a bin from which it is bagged through spouts.



Workman feeding bone into pulverizer. Elevator and bagging spout at right.

Rotary drier with draft fan equipped with sprays which remove dust. Pile of reclaimed material in foreground.

Some of the lime is also sold for dusting orchards and some is mixed in various insecticide preparations for potatoes, vegetables and fruits. The hammer-mill is also used at odd times to produce pulverized limestone and to make poultry grits and flour from oyster shells. Bones are also ground into meal for use in fertilizers after first having been broken in a roll crusher. The finished products are stored in a warehouse with 2,000 square feet of floor space.

In 1939 this company also put in operation, at Baring in Stevens Pass, a plant to produce granite poultry grit. This has a capacity of 350 tons per month. The quarry from which this plant is supplied had been used many years ago to provide building and paving stone for Seattle.

A PAGE OF LIME-PLANT PERSONALITIES

BEN RAVITZ
Quarry Superintendent
Wapello Stone Co.,
Ottumwa, Ia.

C. G. RUEDEBUSCH
General Superintendent,
Mayville White Lime
Works, Mayville, Wis.

PAUL GOSZ
Superintendent,
Allwood Lime Co.,
Manitowoc, Wis.

DAVID FOLLETT
Superintendent,
New England Lime Co.,
Adams, Mass.

C. A. SPELLMAN
Works Manager,
Whiterock Quarries,
Pleasant Gap, Pa.

FRED W. KROEGER
Manager,
Farmers Supply Co.,
Durango, Colo.

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Basset Products Co.,
Monticello, Ky.

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Plant Superintendent,
Atlantic Lime Corp.,
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Pierce City Lime Co.,
Pierce City, Mo.

C. E. BLANKENSHIP
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Montgomery Lime Co.,
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Chemical Lime Co., Ltd.,
Beachville, Ontario

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Keystone Lime Works,
Keystone, Ala.

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Superintendent, New
Enterprise Stone &
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State-by-State Survey Reveals Huge Demand for Agricultural Limestone

● Representatives of the Agricultural Adjustment Agency in the 48 states were recently invited to contribute, for publication in PIT AND QUARRY, brief statements on the operation of its Agricultural Conservation Program in their states. They were asked to estimate future requirements for agricultural limestone, to report past use, and to say something about the problem of increasing production where it is now insufficient to meet the farmers' needs. The replies received up to the time of going to press appear on this and the following pages. — Directing Editor.

NORTHEAST

Connecticut THE amount of agricultural limestone used in Connecticut in 1943 is estimated to be 42,550 tons, of which amount 32,279 tons was supplied by the Agricultural Adjustment Agency. The amount which is expected to be supplied by the AAA for the 1944 program will exceed 62,000 tons, and an additional 10,000 tons may be purchased from suppliers and dealers. The 1945 requirements will be as great as for 1944.

The demand for limestone is very active this spring, and many farmers will not get their supply in time for spring use. However, the total supply should take care of the demand as the manufacture of limestone is estimated over a full 12-month period as anticipated under the 1944 AAA program.

No new producers are entering the field in Connecticut at this time but some of our producers are not working anywhere near their plant capacity due to labor shortages. The existing plants should be operated at capacity before new plants are opened.

About 60 per cent. of the AAA requirements will be delivered to sidings by railway with the farmers doing their own trucking from the sidings. About 12 per cent. will be taken by farmers at the plants and the remainder will be delivered to farmers by truck men.

At present there are enough truckers available to move the supply as fast as it is being produced but considerable trouble has been experienced in the past and, it is expected, will be in the future in regard to keeping enough truckers available to haul the required tonnage over the twelve months' period.

AGRICULTURAL ADJUSTMENT AGENCY.
ERNEST W. SKILTON, *Farmer-Fieldman.*
April 17, 1944.

Maine THE amount of agricultural limestone used in Maine from July 1, 1942, to June 30, 1943, was 48,000 tons. On the same basis the amount used for 1943-1944 will be approximately 90,000 tons.

The demand does not exceed the supply if distributed over a 12-month period. We are short of production in the fall and early spring.

So far as our limited number of plants is concerned, I understand WPB has granted approval for the purchase of pulverizing equipment as requested.

I think new producers should be encouraged to develop lime possibilities here in Maine as we have so few sources at present. There is one company contemplating the establishment of a pulverizing plant in Aroostook County, and we understand they have their equipment allocated.

AGRICULTURAL ADJUSTMENT AGENCY,
A. K. GARDNER, *Executive Assistant.*
April 12, 1944.

Massachusetts THE use of limestone in Massachusetts is increasing quite rapidly. In 1942 we used 47,200 tons, in 1943 we dropped back to 27,000 tons, and in 1944 we expect to use 55,000 tons. The reason for the increased use of lime is the preference given for its delivery to farmers in Massachusetts under the Agricultural Conservation Program as a material in place of payments. So far as I know, the quarries will be able to produce a sufficient amount to meet the demand. While the delivery problem has been difficult so far, a way has been found to handle it. Due to the limited number of trucks available for delivering lime, it has been necessary to keep them continuously employed. Formerly, if we were behind with railway shipments, truck shipments might be discontinued for a few days, but this year it has been necessary to keep the trucks hauling continuously, otherwise the truckers would find other jobs and would not be available when it was necessary to resume truck deliveries again.

AGRICULTURAL CONSERVATION PROGRAM,
S. R. PARKER, *Administrative Officer.*
April 7, 1944.

New Hampshire NEW HAMPSHIRE farmers will use about 35,000 tons of lime in 1944, which is nearly a third more than the largest amount used in any previous year and ten times as much as was used in an average year prior to the AAA program.

There is every indication that farmers will take 35,000 tons or more in 1945, if made available under the program.

There has been wholehearted co-operation of the AAA officials and the lime industry to get maximum output to meet the demand for increased war-food production. The most effective measure has been the move to spread the business over the full twelve months of the year.

On account of being a long distance from crushing plants, and of the individual farm orders being small, New Hampshire farmers take their lime at the car door at the nearest siding, and haul and spread it themselves. Lime and superphosphate supplemented by potash, which farmers are encouraged to buy, are working a transformation in New Hampshire farming.

AGRICULTURAL CONSERVATION PROGRAM,
EARL P. ROBINSON, *Executive Assistant.*
April 7, 1944.

New Jersey THE amount of agricultural lime used in New Jersey in 1943, estimated tonnage, will be about 120,000 tons. The amount used in 1944 will be 140,000 tons. This will depend a great deal upon the ability of suppliers to deliver, which is still an unknown quantity for 1944. The 1945 use will depend, first, on the program that the AAA offers the state, and, second, on the ability of suppliers to produce. As neither one of these factors is known now, I would estimate the figure the same as 1944.

The demand exceeds the supply. Inasmuch as there has been an educational program for the use of lime for years by the colleges and Extension Service and the direct-action program of the AAA, the use of lime has jumped. Regardless of the 12-month delivery program of the AAA, the suppliers have been unable to keep their production up to 100 per cent. of capacity, and mainly because of labor difficulties production is decreasing rather than increasing.

As a long-time policy new producers should be encouraged, as this state can easily use 200,000 tons of lime annually. The 1942 figure was 115,000 tons.

AGRICULTURAL ADJUSTMENT AGENCY,
KENNETH S. ROBERTS, *State Committeeman.*
April 19, 1944.

New York IN a report from A. F. Gustafson, Professor of Soil Technology, Cornell University, we find that 522,000 tons of agricultural limestone was used by New York farmers during the calendar year 1943. During the AAA Program year—from September 1, 1942, to August 31, 1943—369,000 tons of lime was furnished to New York farmers in lieu of cash payments. This is included in the report made by Professor Gustafson.

In our opinion, the amount of lime used in 1944 and also 1945 will exceed the amount used in 1943 because the Agricultural Adjustment Agency alone plans to furnish 700,000 tons as a conservation material. This tonnage, of course, will be furnished during the program year beginning September 1, 1943, and extending through October 31, 1944. This expected increase is based on the fact that agronomists in New York estimated a need of over 1,000,000 tons of ground limestone per year for application on New York soils.

The present demand exceeds the sup-

ply primarily because of the serious man-power shortage. Lime suppliers throughout the state are faced with the problem of keeping the men they are now using because of the draft, and they are also having difficulty in replacing the men they lose. There does not seem to be any additional help available.

In the few cases brought to our attention the WPB has granted approval for the purchase of new pulverizing equipment at an adequate rate.

It is questionable whether new producers should be encouraged to enter the field because of the labor situation and also because of the difficulty in distributing lime.

We see no solution at present to the man-power shortage either in the actual manufacturing of the lime or in the delivering and spreading of the material.

AGRICULTURAL ADJUSTMENT AGENCY,
W. L. WEBSTER, *Deputy Executive Assistant.*
April 17, 1944.

Rhode Island WE estimate the use of limestone in Rhode Island in 1943 to be 6,640 tons. We anticipate the amount to be used in 1944 at about 8,500 tons, with about the same amount in 1945.

The present demand seems to exceed the supply, primarily because the only lime quarry in the state is out of operation.

As far as we know, the War Production Board has been granting approval for the purchase of new pulverizing equipment, although we have not been directly involved in Rhode Island.

We believe that, if the quarries in Rhode Island were in full operation, our supply situation would be favorable. This, of course, assumes a supply available from outside the state. The WPB in Rhode Island has been and is sympathetic to agriculture and the allied industries.

We do not see any possible solution to the manpower situation. The indications are that it will be much worse before it is better.

RHODE ISLAND STATE OFFICE,
R. S. SHAW, *Executive Assistant.*
April 11, 1944.

Vermont BEFORE the Agricultural Conservation Program started, the annual consumption of agricultural lime in Vermont was about 3,500 tons, and after the program started the consumption increased until it reached an all-time high of 93,000 tons in 1942. The use of lime under the ACP varied with the amount of superphosphate which could be obtained under the farmers' allowances. That is why in some years the amount used is much higher than in others.

Under the 1944 ACP we expect to furnish 118,000 tons of ground limestone to Vermont farmers. Our agronomists state that we need at least 150,000 tons of lime each year in order to maintain the soil alkalinity. It will be impossible to complete deliveries of this amount (118,000 tons) for spring use. Everything is being done to deliver as much material as possible to the farms when it is needed, but, because the orders far exceed the amount which can be furnished during a short fall and spring delivery period, deliveries will have to be spread over the entire program year, which ends October 31, 1944.

The lime companies furnishing the material to this state have labor problems, but so far the labor shortage has not noticeably jeopardized production or the deliveries. However, we are anticipating that it may be increasingly difficult to meet the labor shortage which is daily becoming more acute.

VERMONT AGRICULTURAL CONSERVATION PROGRAM,
RUTH F. SINCLAIR, *Administrative Assistant.*
April 17, 1944.

EAST CENTRAL

Delaware THE amount of agricultural limestone used in Delaware in 1943 was 49,000 tons. The amount that will be used in 1944 is estimated to be 56,200 tons, if the trade can furnish it in spite of the shortage of labor in the lime plants. The 1945 use will be about the same as that of 1944.

Present demands exceed the available supply by perhaps 25 per cent. because of the labor shortage in processing plants. One large producer stated that his capacity, because of the labor shortage and the type of help obtained, was reduced from 1,100 tons to 400 tons per week. The short available supply appears not to be due to the lack of equipment or repairs but to the scarcity of labor.

We feel that there are sufficient plants in operation, if they could be worked to capacity.

To date it appears that the bottleneck is wholly the amount of labor, and the quality of labor, 50 per cent. each, that is limiting our supply of lime products. The trucking situation at present is adequate, but intensified shortages of both manpower and trucks are anticipated shortly.

The only relief appears to be an immediate letup on the part of all draft boards, as regards all types of agricultural workers.

DELAWARE STATE AAA COMMITTEE,
C. E. OCHELTREE, *Chairman.*
April 18, 1944.

Kentucky UNDER the 1943 AAA program in Kentucky the estimated usage of ground limestone was in excess of 1,000,000 tons. While this utilization was lower than the 1,285,000 tons spread during the 1942 program, it was more than offset by a 90 per cent. increase in the distribution of phosphate over the previous year. The goal for limestone in 1944 is a higher tonnage over 1943, and if the quantities now under contract are delivered the goal will be reached.

This year our organization in Kentucky has entered into a larger number of contracts with manufacturers, dealers and suppliers of limestone than in any previous year. Our expectation is that the demand, reasonably constant during the last few years, will be increased not only because of the great food-production effort but because also of the limitations in the supply of phosphate in prospect for the current program. Whether the demand will exceed the supply under contract remains to be seen.

Even though we have a much larger number of sources of supply under contract and although the War Food Administration has established facilities to aid manufacturers and distributors with peculiar problems arising from the nature of the times, our organization has received surprisingly little comment from the trade regarding the inability to obtain new items of equipment, such as pulverizers, or the inadequacy of the price structure provided under Maximum Price Regulation 386. There are several instances in our knowledge in which the maximum price regulation mentioned has been utilized to obtain the price increases considered desirable because of higher production costs.

Man-power problems among truckers are known to exist. With limestone distribution, however, the problems thus far have been met in a fairly satisfactory manner so that no situation bordering on the acute has yet been reached in this area.

M. D. ROYSE, *Chairman* STATE AAA COMMITTEE.
April 8, 1944.

Maryland MARYLAND farmers in 1943 applied 194,183 tons of limestone products to their soils. Of that total the Agricultural Adjustment Agency distributed 54,000 tons under AAA contracts. The AAA is now making payments to farmers for an additional tonnage purchased by farmers directly through trade channels.

Manufacturers and dealers have contracted with the AAA to furnish 275,000 tons in 1944. Current AAA orders indicate that the total state consumption this year will exceed that figure.

The demand exceeds the supply again this year as it did in 1943. The scarcity of quarry labor is responsible, producers claim. Large producers assure the Maryland agricultural leaders that quarry equipment is adequate and that expansion of the industry is not the answer to the problem. They are struggling with less than half their normal labor forces to meet greatly increased demands.

AGRICULTURAL ADJUSTMENT AGENCY,
JOSEPH H. BLANDFORD, *Chairman.*
April 12, 1944.

North Carolina IN 1943 469,000 tons of agricultural limestone was used in North Carolina under the AAA Program and it is estimated that approximately 30,000 tons more was purchased through private trade channels.

We expect to receive orders for approximately 750,000 tons in 1944 and 900,000 tons in 1945, but unless there is a change in the loading facilities of the supplying companies along with a loosening up of shortages of cars for shipment, we do not expect to receive more than 500,000 tons in either year.

The present demand for limestone is in excess of the supply due to a change in the basic provisions of the agricultural conservation program whereby the major emphasis is being put on soil-building and soil-conserving practices. The supply of limestone at the supplying plants is adequate to meet our needs but there is a definite bottleneck in regard to loading equipment and railroad cars for transportation.

Insofar as we know, the War Production Board has granted approval for new pulverizing equipment at the only plant having requested it.

There are limestone deposits in North Carolina which could be developed into major sources of supply, but, with one exception, the companies from which we are obtaining our present supply are selling us limestone which is a by-product of operations the major purpose of which is the production of zinc.

We are beginning to develop stock piles in the various counties whereby unloading machinery can be used and thus eliminate some of the man-power needed in the handling of the material. This

appears to be the solution to our problem, but we have had some difficulty since such machinery is very expensive and the majority of our limestone truckers do not have the capital to warrant much investment of this type.

STATE AAA COMMITTEE,
G. T. SCOTT, *Chairman.*
April 12, 1944.

Virginia WE do not have any definite information on the exact tonnage of liming materials used in Virginia during 1943 since our records reflect only that used by farmers participating in the AAA program. However, on the basis of the annual increase in total liming materials used in the state, it is estimated that approximately 1,000,000 tons of liming materials was used in Virginia during 1943. This, of course, would include marl and hydrated lime as well as ground limestone.

If the increase continues, and there is no reason to believe but that it will, the amount of liming materials used in 1944 should be approximately 1,200,000 tons and by 1945 approximately 1,500,000 tons. This estimate is based on the assumption that the supply of material will materially increase over the present supply available in this state.

The present demand for liming materials exceeds the supply. During the past five to ten years the quantity of ground limestone used as filler in fertilizer has increased materially and the value of liming material has been more generally recognized by the farmers in this state. The average annual tonnage of liming materials used in Virginia between the years 1929 and 1932 was only 182,000 tons. The production of liming materials in this state has not increased as rapidly as the demand. We have had several new plants come into production, but each year the demand has exceeded the supply.

We do not have any information which would indicate that the War Production Board has refused to approve the purchase of new pulverizing equipment. However, there may be individuals who have endeavored to secure new equipment who could not obtain approval but, to my knowledge, lime producers in this state have had very little difficulty in securing the necessary equipment.

I am of the opinion that there is a very definite need for new producers to enter the field of limestone production in this state. In view of the great need for this material, there should be a considerable increase in production since at present it appears that the lack of sufficient production capacity will hinder the progressive increase in the use of this material.

The Office of Price Administration in MPR-386, dated May 10, 1943, revised its policy in connection with ceiling prices. I do not know what the future policy of OPA will be in connection with increased prices for ground limestone.

The greatest problem which we have in this state in connection with the production and distribution of liming materials is the shortage of man-power. I do not know of any immediate solution to this problem.

VIRGINIA STATE AAA COMMITTEE.
MARION T. PRATT, *Member*
April 11, 1944.

West Virginia IT is estimated that 350,000 tons of limestone or its equivalent was used under the AAA Program in 1943 plus an estimated 10,000 tons used otherwise on farms in West Virginia. Probably we will use in 1944 a total of 350,000 tons. For 1945, the amount will likely be reduced unless the trucking situation is improved. The supply is adequate. Trucking is our great bottleneck.

There is no need for WPB approval on equipment.

Only in a few sections of our state do new producers need to be encouraged to enter the field.

Most of the state's sources are fairly well established. Capital investment will not be too great with most of our suppliers, therefore, OPA relief will not affect this item as much as the price of trucking.

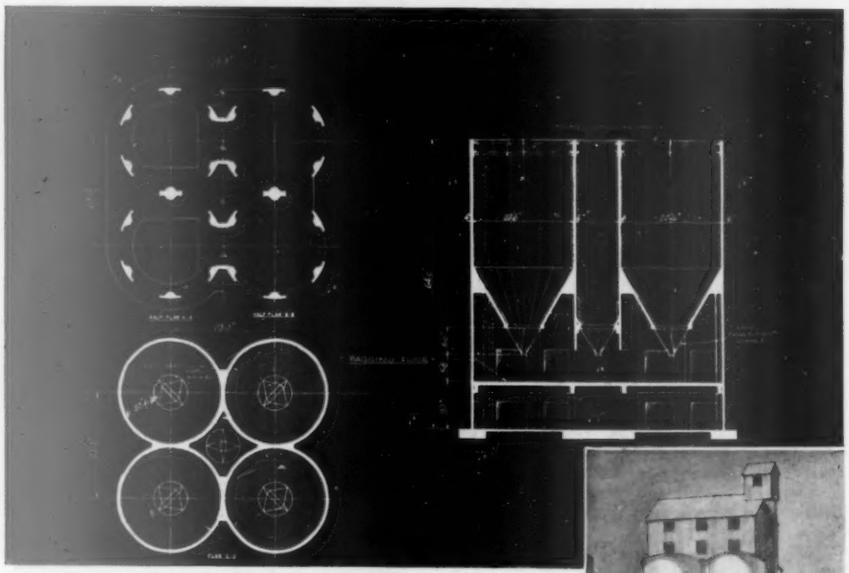
There is just nothing in sight which it is thought will solve the man-power shortage. Our tonnage estimates are based on the above statement. Perhaps 400,000 or more tons of limestone would be delivered to farms except for the labor situation.

STATE AAA COMMITTEE,
J. WARD WOOD, *Chairman.*
April 7, 1944.

NORTH CENTRAL

Illinois EXTENSIVE use of Agricultural Limestone has been encouraged by AAA and other government agencies, and the demand has increased during the past few years. Various agricultural authorities have estimated the yearly demand at from 4,500,000 to 5,000,000 tons in Illinois. Production

THE ARMY STILL TRAVELS ON ITS STOMACH



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during the past year has been approximately 1,000,000 tons short of meeting this demand. The War Food Administration has requested that the production of agricultural limestone be increased in 1944. But it seems reasonable to assume that there still will not be sufficient available material.

In some cases in Illinois agricultural limestone was produced as a co-product or by-product of other grinding operations. The demand for these other products has diminished sufficiently so that the production of agricultural limestone will be curtailed unless it is produced as a prime-product. Some manufacturers are finding it impossible to obtain the necessary equipment and labor for such an operation. Others have been able to obtain sufficient machinery to manufacture agricultural limestone as a prime-product, and are finding it necessary to increase the price of the material because of the added cost of recrushing their prime-product into agricultural limestone. This increased cost seems justifiable in these cases, especially if more material is made available.

Governmental agencies are co-operating wherever possible in assisting the manufacturers to increase their production. However, there still probably will be a shortage of labor and a delay in obtaining sufficient machinery and repairs. Even with these handicaps, some producers will have a large supply available. We feel certain that it all will be utilized by the farmers of Illinois to the best possible advantage in the war effort.

ILLINOIS AAA COMMITTEE.
LEE M. GENTRY, *Chairman,*
April 5, 1944.

Indiana DURING 1943 the AAA furnished to farmers throughout Indiana 916,312 tons of limestone and 73,140 cubic yards of marl. We do not know the amount of material furnished commercially; however, we estimate that approximately 400,000 tons was secured by farmers from various quarries within the state.

The amount of material to be used in 1944 depends largely upon the production and delivery facilities. Some quarry operators are losing key men to the draft and this may seriously affect the production of material. It is practically impossible to secure new trucks for use in hauling limestone; however, it is our opinion that the AAA will be able to furnish approximately 1,000,000 tons of material in 1944. The amount of material secured commercially will probably be about the same as in 1943. Unless there is a larger amount of material produced for 1945, and there is more labor, equipment, and machinery available, in all probability the production will be somewhat less in 1945 than in 1943.

The present demand for agricultural limestone is far in excess of the supply. We believe that there is a demand for approximately 2,000,000 tons of limestone throughout Indiana. This demand is so great because farmers have been using limestone to a great extent since 1940, and experiments have proved that the use of limestone will materially increase the production of various crops.

As far as we are able to determine the War Production Board has been granting approval for the purchase of new pulverizing equipment. We do not know of any case where an application has been turned down by the WPB for the purchase of machinery to be used in producing agricultural limestone.

We have some stone companies throughout Indiana that should materially increase production at their quarries; however, some of them have closed their quarries because they have previously produced agricultural limestone as a by-product and, at the present time, the demand for limestone and other material is not sufficient to enable them to continue operating under this plan. If these quarries were to produce agricultural limestone as a sole product, we believe that it would not take very much additional equipment to arrange their quarries for making the material.

We have several new producers who have opened quarries since 1942. These producers have been increasing their production of agricultural limestone; however, we believe that we need several other quarries in order to produce the amount of material which is needed in our state. Since the AAA began furnishing limestone the producers have not had to advertise their product. The AAA has encouraged farmers to use limestone and through our organization the demand has increased yearly, and we do not know of any quarry that has produced material in any year that could not be distributed.

Price ceilings for agricultural limestone are controlled by the Office of Price Administration and past experience has proved that they are willing to adjust ceilings in those cases where the producers can prove to them that their

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present cost of production has increased over their 1941 cost of production.

INDIANA AGRICULTURAL CONSERVATION COMMITTEE,
CLARK L. BAKER, *Acting Chairman.*
April 11, 1944.

Iowa DURING 1943 852,891 tons of agricultural limestone was furnished to Iowa farmers through the AAA program. This tonnage was augmented by a large tonnage of cash lime, purchased by farmers, but records of cash purchases are not maintained by the state AAA farm office.

To date contracts have been awarded for agricultural limestone for 1944 delivery approximating 612,300 tons. It is anticipated that additional contracts will be awarded.

The year's total tonnage, however, is dependent upon the availability of labor and equipment. Tires are an important item in this year's distribution. The AAA farm office is co-operating in every way possible with other governmental agencies to assist them in the distribution of available equipment.

IOWA AGRICULTURAL CONSERVATION COMMITTEE,
H. L. DIETERICK, *Acting Chairman.*
April 7, 1944.

Michigan LIMESTONE handlers under contract with the AAA in Michigan distributed 114,119 tons of ground stone in 1943. This amount represents a substantial decrease below 1942. The decrease is due to a reduction in the number of contractors handling the material in 1943.

Limestone is not used in all the counties in Michigan due to the fact that refuse lime and marl are available in large quantities and at a very reasonable price. We anticipate a greater demand for limestone, however, this year. Facilities and labor for handling the refuse material and marl are limited.

The present supply of limestone is sufficient to meet demands in so far as production of the material is concerned. If the farmers' needs are not supplied, it will be due to a shortage of labor for hauling and spreading the material. Some of our most valuable operators have been taken into the Army.

Limestone producers report fine co-operation through the War Production Board in obtaining equipment and repair parts for their operations.

Under present labor conditions, shortage of transportation, etc., it would appear unnecessary for new producers to enter the field of limestone production. As a post-war program, we can see a large field of expansion justified in order to meet the demands for liming materials created by the experience gained by farmers through their use of the material furnished under the program of the Agricultural Adjustment Agency.

At present the labor problem throughout the entire limestone industry is very serious. It is our opinion that it will become worse before it changes to a better condition.

As long as the production of war materials and the armed forces continue to draw heavily on man power, there can be no solution to the problem. The application of liming materials will simply have to be limited to the bare minimum requirements until the war is over. After that, with a continuation of the Agricultural Conservation Program to assist farmers in obtaining materials at the minimum direct cost, we anticipate a liming program in Michigan many times greater in volume than has ever been carried out in the past.

MICHIGAN AGRICULTURAL CONSERVATION COMMITTEE,
MAURIN A. DOAN, *Chairman.*
April 17, 1944.

Missouri MISSOURI farmers continue to demonstrate their conviction that limestone is essential to increased agricultural production and long-time conservation of the soil. In 1943, in spite of war-time handicaps, they used approximately 1,483,000 tons of liming materials, of which 1,028,352 tons was advanced through the Agricultural Conservation Program in lieu of cash payments. An additional 1,500,000 tons would have been readily absorbed had it been available.

The Agricultural Adjustment Agency has contracted for 1,210,345 tons of liming material for delivery during 1944 to Missouri farms. This amount, plus material available for cash, will be wholly inadequate to supply the demand. Production could be increased to some extent with available equipment, but distribution is limited because of insufficient labor, trucks, and tires. We feel sure that a minimum of 3,000,000 tons would be used in 1944 and again in 1945 if the production and distribution problem could be solved, with particular emphasis on distribution. The War Production Board has in most cases approved production equipment necessary under existing circumstances. The industry is considered as essential and as such has received due recognition by the WPB.

The transportation problem may be partially solved by truckers released from other federal construction projects; however, we feel that it will continue to be a major problem for the industry. The price ceiling policy established by OPA has not seriously hampered production in Missouri.

New producers should be encouraged to establish themselves in the industry in Missouri in view of the almost unlimited demand and the availability of quarries in almost any section of our state.

MISSOURI AGRICULTURAL CONSERVATION COMMITTEE,
C. W. SHEPPARD, *Chairman.*
April 11, 1944.

Ohio THE amount of agricultural ground limestone used in Ohio in 1943 was 835,205 tons. This office believes that the amount of liming material to be used in 1944 and 1945 will exceed the tonnage used during 1943.

We believe that present demands exceed the supply because the Agricultural Adjustment Agency has educated the farmer as to the necessity of limestone by putting it on the farm where he can see the advantage of more and better crops on fewer acres. This has helped to improve the agricultural-limestone industry.

Since we had been producing a large volume of limestone prior to the war, we believe most quarries are equipped to take care of the limestone needs of today.

We believe that new producers should not be encouraged to enter the field except in localities where demands would necessitate more limestone production to eliminate extensive hauls. This thought is based on the difficulty of obtaining new equipment.

It has been the observation of this office that O.P.A. does co-operate where a producer shows substantial evidence that he is unable to operate at a profit.

To date we have not experienced too much difficulty in regard to man-power shortage and believe that the limestone for 1944 will be delivered unless some unforeseen drainage of man-power is made by the armed services in the near future.

We believe the greatest difficulty in 1944 will be equipment to deliver and spread the limestone.

OHIO AGRICULTURAL CONSERVATION COMMITTEE,
W. H. NICHOLS, *Acting in Charge.*
April 22, 1944.

Wisconsin THE amount of agricultural limestone used in Wisconsin through the AAA Program in 1943 was approximately 1,200,000 tons. This limestone was distributed in practically every county in the state. Our records for 1944 indicate that approximately 1,900,000 tons will be used. This increase is primarily due to the fact that lime is an "unlimited practice" in Wisconsin, which means that individual farmers may exceed their basic allowance by 50 per cent. by the use of lime or other practices that have been designated as unlimited practices.

The demand for and supply of limestone in Wisconsin is pretty well in balance. We are fortunate enough to have a sufficient number of producers scattered throughout the state so that we expect that all orders for limestone will be taken care of unless some unforeseen emergency will arise.

From the standpoint of equipment, the condition is not too serious in Wisconsin. Of course, any machinery that is used in the preparation and handling of ground limestone is subject to hard wear and will require repairs and replacement. Again, unless some unforeseen emergency should arise, the limestone producers in the field already may be able to handle the situation, at least as far as the 1944 program is concerned.

The man-power situation in the state is about in line with that of all the surrounding states. There is, of course, a shortage of man power in all lines and that also would apply to the limestone-grinding industry.

WISCONSIN AGRICULTURAL CONSERVATION COMMITTEE,
ROBERT C. SCHULTZ,
Acting Chairman.
April 20, 1944.

[AAA representatives in Nebraska and South Dakota report little demand for agricultural limestone in their states.—EDITOR.]

SOUTHERN

Alabama IN 1939, the first year agricultural limestone was distributed through the AAA program, the farmers of Alabama used 23,000 tons. There has been a gradual increase in the tonnage used until under the 1943 program there was distributed through our program 165,000 tons. It is estimated that we will distribute during the 1944 program year a minimum of 300,000 tons, as we have approved requests as of March 31, 1944, totalling 112,000 tons.

The distribution of limestone by the AAA in this state is a "limited practice," and the tonnage requested is infinitesimal as compared to the needs and the amount that would be requested if the type of program was changed so as to

make the liming of the soil an "unlimited practice."

The state is fortunate in having a large number of deposits of limestone of a high grade, but owing to the limited demand prior to this time the deposits have not been developed. The present operators are shipping a large percentage of their output to other states in the southeast, and the present demand far exceeds the supply.

We are interesting some capital in the development of some of the quarries and would like to interest others, as the Extension agronomists tell us that there is a need in this state for at least 1,000,000 tons yearly for years to come. We have advice that the WPB will co-operate in granting approval for the purchase of such equipment as is necessary in order to provide for adequate production for the 1944 and 1945 program years.

AGRICULTURAL ADJUSTMENT AGENCY,
A. W. JONES,
Administrative Officer in Charge.
April 20, 1944.

Arkansas THE amount of agricultural limestone used in Arkansas in 1943 was approximately 45,000 tons. The amount which will be used in 1944 will range probably between 100,000 and 150,000 tons, depending on whether or not contractors can make delivery of the material requested by farmers. The amount which would be used in 1945 would be in the neighborhood of 200,000 tons.

The demand for 1944 exceeds the supply of material due to the limited capacity of crushing plants which furnish agricultural limestone. The capacity of the plants is limited by the size of the crushing machinery and the difficulty in securing repair parts and the necessary labor for operation. The supply is also limited by the available facilities for trucking the material to individual farmyards.

So far as we have been able to determine, the War Production Board has been granting approval for the purchase of new pulverizing equipment, however, even after priorities are granted by the WPB for the purchase of equipment or repair parts the contractors in some cases have had difficulty in locating the material due to the fact that some of the steel used in manufacturing parts and crushing equipment is also used by the Army and Navy which have a higher priority.

It is our opinion that new producers should be encouraged to enter the field. New producers should bear in mind that the more widely distributed over the state are the plants for producing agricultural limestone, the more counties can be served at a lower hauling cost, which in turn results in an increased use of the material by farmers.

With regard to OPA price relief to cover the added cost of production, in discussing prices with various contractors in the state it appears that the present prices are adequate provided it would be possible to work out some method whereby an increased volume of orders might be anticipated by the producers. Increasing the volume of orders, however, ties in with whether or not prompt delivery of the material can be secured. For example, if a farmer requests agricultural limestone and then expects delivery of the material within three weeks or 30 days and the material is not delivered for 6 weeks or 2 months or longer, he becomes discouraged and in turn discourages other farmers from placing

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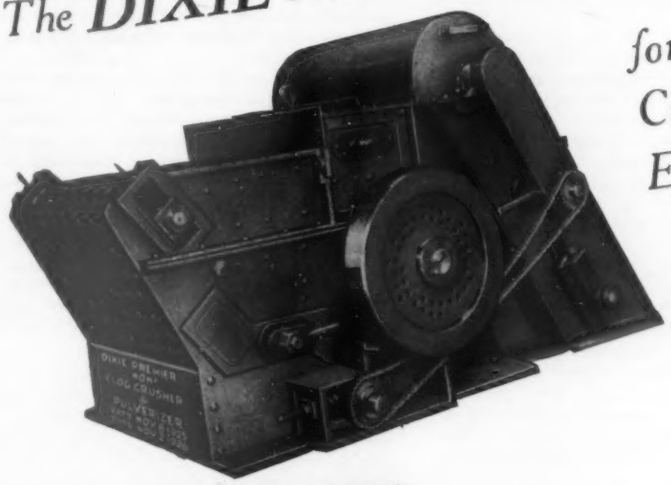

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orders. It is possible that prices in Arkansas, due to the type of operations, allow a somewhat larger margin than prices for agricultural limestone in other states, such as Missouri and Illinois, where there is a greater use of agricultural limestone.

At the present time the difficulties experienced in Arkansas relative to manpower shortage among truckers have been slight in relation to the difficulty experienced in securing trucks, replacements, and repair parts for the trucks which are now operating.

It appears that, if the operations of the bauxite mines are curtailed with regard to some of the preliminary operations which have recently been using a great number of trucks, such trucks might be available for farmyard delivery of agricultural limestone.

AGRICULTURAL ADJUSTMENT AGENCY,
J. L. WRIGHT,
Administrative Officer in Charge.
April 13, 1944.

Florida IN 1942 Florida used 44,570 tons of limestone. For 1943 our estimate is 41,100 tons used. For 1944 we will probably use about 40,000 tons unless conditions change materially.

The present supply will take care of the demand for high-calcium limestone. The present facilities for mining dolomite are, because of labor shortages, not being fully used.

Our chief problem relates to trucks, as we are unable at present to secure farmyard delivery contracts because of the scarcity of trucks and truck drivers available to haul limestone. Without farmyard delivery and with the existing shortage of labor and equipment on farms to haul and spread lime it is not possible for farmers to use the quantities of limestone they actually need. At present we can see no early solution to the truck and man-power shortage for this type of work.

AGRICULTURAL ADJUSTMENT AGENCY,
H. G. CLAYTON,
Administratice Officer in Charge.
April 18, 1944.

Georgia IN 1943 the AAA furnished, as a conservation material, 55,030 tons of limestone to Georgia farmers. It is estimated that approximately 65,000 to 70,000 tons was actually used which includes that amount furnished by the AAA. These figures do not include material furnished by producers to fertilizer manufacturers.

In 1944 and 1945 the amount to be furnished as conservation material will be substantially larger than in 1943. Our estimates range from 100,000 to 125,000 tons in 1944, and in 1945 a proportionate increase of about the increase of 1944 over 1943.

The present demand for agricultural limestone exceeds the supply for the following reasons:

(a) The present type of AAA program embodying payments only for carrying out soil-conservation practices.

(b) Results of an educational program by the AAA and other agencies and the program projected by various limestone producers.

(c) The requirements of the elements of limestone, such as magnesium and calcium, for increased production of food and feed crops.

(d) The natural desire and tendency of farmers to apply materials which will tend to increase production of food and feed crops under the program projected by the War Food Administration.

The experience of this state has been that the WPB has acted favorably on requests for the varying types of production equipment needed by the producers in this state; however, despite this, production capacity has not advanced to the same degree as the demand.

It is definitely our opinion that new producers should be encouraged to enter the field of agricultural-limestone production. The indications are that government agencies responsible for the allocation of equipment for this purpose, in view of the critical need for increased production of limestone, would look with favor upon such.

Under the stabilization program and the fact that a reasonable price is a directly contributing factor to the volume, it appears improbable that any great amount of increase can be expected in the price of agricultural limestone in view of the present price to the individual user.

At present the man-power shortage in the production and delivery of limestone is a major problem and with the present existing circumstances the solution of this problem appears of greater difficulty now than in the past.

AGRICULTURAL ADJUSTMENT AGENCY,
T. R. BREEDLOVE,
Administrative Officer.
April 11, 1944.

Louisiana IT is expected that during the coming year the use of agricultural limestone in Louisiana will increase more than 27 times over the past year. According to the best information the AAA can obtain, Louisiana farmers used 9,000 tons of lime in 1943, or from September, 1942, to August 31, 1943. With the orders that have been placed through the AAA for conservation materials and services and with the lime known to have been obtained through other sources it is estimated that during the period September 1, 1943, to December 31, 1944, Louisiana farmers will use 250,000 tons.

Orders are running even higher than this and it is believed that the demand will be for even more lime, but it is not expected that more than 250,000 tons can be produced and distributed.

This tremendous increase is attributed to the general trend toward pasture improvement in Louisiana and to the use which farmers are making of the unlimited pasture-improvement program of the AAA.

Based on the assumption that limestone will be available as a conservation material under the 1945 Agricultural Conservation Program and that the payment provisions under that program will be as liberal in 1945 as they are in 1944, we believe that it is reasonable to assume that Louisiana farmers will use 325,000 tons of agricultural lime in 1945. There, again, we think the demand will be greater, but the limit will be the amount that can be produced and transported to the farm. The demand for bagged lime in Louisiana has been far greater than the only two sources under contract are able to supply. With more sources from which to obtain bulk lime, the situation is more favorable and most of the requests now being made are for bulk lime. We believe that the demand is greatly accelerated because of the encouragement by the AAA, not only for the application of lime, but for the improvement of pastures. The emphasis that the war has placed on livestock and livestock products naturally has caused more attention to be turned to the improvement of pastures and the products that go to make up their improvement.

As far as this state is concerned, the War Production Board has given full cooperation in seeing that the pulverizing equipment was adequate to take care of the production capacity of the plants in the state.

It is definite that where possible new producers should be encouraged to enter the field because we feel in this state that the estimate for 1944, which is a tremendous increase over 1943, is just scratching the surface as far as the need for the product is concerned.

While we see no immediate solution to the man-power shortage for truckers to deliver and spread the material, it has been our experience in this state that where we can have reasonable assurance of deliveries of lime at given dates it has been possible to arrange with truck owners to deliver it from railroads to farms under contract. Incidentally we see the delivery and spreading of the material as one of the main cogs in our ultimate use of lime.

It is not necessary to further encourage the use of lime in bags because the available supply for the current year has apparently been requested. We are encouraging the use of lime in connection with pasture-improvement work and it appears that orders for bulk lime to be delivered to farms under truck-hauling contracts will have a better chance of being filled for the remainder of 1944 than orders for bagged lime.

AGRICULTURAL ADJUSTMENT AGENCY,
A. C. SMITH,
Administrative Officer in Charge.
April 11, 1944.

Mississippi "LIMING the land" is one of the important things farmers are doing under the AAA program in Mississippi to help increase production now when it is vitally needed. Our sights are high because of the importance of limestone in the maintenance of soil productivity. As of April 7 of the 486,209 tons ordered under the 1944 program 114,248 tons has already been shipped. For the remainder of the year shipments, of course, will be dependent on whether quarries can supply the material, and labor and transportation facilities are available. This 1944 tonnage compares with only 27,000 tons ordered through the AAA in 1943, 10,000 tons in 1942, 3,900 in 1941, 1,800 in 1940, and 600 tons in 1939.

Development of our natural state limestone deposits has been rather slow because, for one reason, until this year the demand has been small. We must rely, therefore, upon quarries outside the state. New producers are being encouraged to enter the field. In fact, at the recent session of the Mississippi Legislature an Agricultural Lime Commission was established and an appropriation made to expand the lime-production capacity in the state. The War Production Board and the Office of Price Administration have looked upon a liming program with favor. In this state no request for pulverizing equipment or an increase in price, where such increase was justifiable, has been refused.

AGRICULTURAL ADJUSTMENT AGENCY,
T. M. PATTERSON,
Administrative Officer in Charge.
April 8, 1944.

AGRICULTURAL LIMESTONE ORDERED BY THE AGRICULTURAL ADJUSTMENT AGENCY AND DELIVERED—1943

Region and State	Ordered (Tons)	Delivered (Tons)
EAST CENTRAL		
Delaware	4,600	4,300
Kentucky	450,000	370,000
Maryland	73,000	63,000
North Carolina	470,000	450,000
Tennessee	742,000	665,000
Virginia	523,000	473,000
West Virginia	415,000	360,000
Totals	2,677,600	2,385,300
NORTHEAST		
Connecticut	46,370	36,627
Maine	66,047	58,674
Massachusetts	42,007	31,467
New Hampshire	27,692	21,040
New Jersey	80,960	54,037
New York	457,500	361,772
Pennsylvania	599,980	555,783
Rhode Island	6,017	4,431
Vermont	87,844	65,288
Totals	1,414,417	1,189,119
NORTH CENTRAL		
Illinois	1,204,504	944,502
Indiana	1,282,302	916,667
Iowa	969,275	758,045
Michigan	490,840	476,319
Minnesota	281,145	256,420
Missouri	1,224,340	945,719
Ohio	898,741	729,409
Wisconsin	700,508	615,686
Totals	7,051,655	8,642,767
SOUTHERN		
Alabama	137,256	134,256
Arkansas	66,177	51,177
Florida	8,339	7,699
Georgia	56,851	52,623
Louisiana	13,703	7,151
Mississippi	69,843	60,305
Oklahoma	19,244	15,244
South Carolina	110,274	104,551
Texas	600	600
Totals	482,287	433,606
WESTERN		
California	.....	.....
Kansas	238,993	141,628
Oregon	6,885	6,403
Utah	.....	.....
Washington	522	522
Totals	246,400	148,553
Grand Totals	11,872,359	9,799,345

OTHER CONSERVATION MATERIALS ORDERED BY THE AGRICULTURAL ADJUSTMENT AGENCY AND DELIVERED—1943

Region and State	Ordered (Tons)	Delivered (Tons)
BORAX		
WESTERN		
California	1,781	1,731
BASIC SLAG		
EAST CENTRAL		
Tennessee	12,276	9,000
SOUTHERN		
Alabama	27,251	27,251
Georgia	7,805	7,805
Mississippi	9,100	9,100
Totals	44,156	44,156
RAW ROCK PHOSPHATE		
NORTH CENTRAL		
Illinois	52,010	45,410
EAST CENTRAL		
Kentucky	3,945	3,300
GYPSUM		
NORTH CENTRAL		
Minnesota	1,165.80	1,165.80

Oklahoma IN the past there has been a comparatively small amount of agricultural limestone used in Oklahoma. However, due to the provisions in the 1944 Agricultural Conservation Program, which make it possible for farmers to obtain assistance in applying limestone to their farms, we anticipate that possibly ten times as much limestone will be applied during 1944 as has been applied during previous years. If the same provisions are available in 1945, this demand is likely to increase as our farmers become more familiar with the limestone program and the need for limestone on their land.

The present demand exceeds the supply because we do not have many producers of limestone in Oklahoma. We believe that new producers should be encouraged to enter the field in the state since it is very desirable that we have a source of agricultural limestone as close to the points where needed as possible in order to avoid payment of freight and to conserve present transportation facilities. We have been attempting for some time to locate adequate sources of supply and have succeeded in obtaining contracts with a number of limestone producers to furnish the material and deliver it to the farms.

We have recently issued invitations to bid to a number of agricultural-limestone producers, requesting bids f.o.b. the plant on limestone which can be shipped to the local county agricultural-conservation associations and delivered to the farms at a reasonable price. In general, we believe that if we can obtain the limestone, the farmers will, if necessary, drive the trucks which deliver the material.

AGRICULTURAL ADJUSTMENT AGENCY
H. P. MOFFITT, *Administrative Officer in Charge*
April 22, 1944

South Carolina FOR the period 1939-43 South Carolina has used an average of 110,000 tons of agricultural limestone partly for direct application to the soil. Due to the extensive and intensive limestone program of the Agricultural Adjustment Agency for 1944, it is indicated that farmers in this state would use 700,000 tons of limestone if delivery could be made. It is expected that a minimum delivery of 300,000 will be obtained. At present the demand is far in excess of any available supply. The AAA is now shipping limestone into this state from points in Alabama, Georgia, Tennessee and Virginia. New producers should be encouraged to enter into the production of agricultural limestone in South Carolina.

AGRICULTURAL ADJUSTMENT AGENCY,
R. W. HAMILTON, *Administrative Officer.*
April 17, 1944.

Texas THE application of agricultural limestone in Texas heretofore has been a minor soil-building practice, and only now are we endeavoring to put into operation an extensive liming program. One of the chief reasons for our lack of an extensive liming program in the past has been the absence of experimental data proving the need of lime in any particular area. However, more recent tests have disclosed lime deficiencies in certain areas and we anticipate that a successful liming program will be carried on in these areas.

Only 600 tons of agricultural limestone was applied in 1943. We estimate that 7,500 tons will be applied in 1944 and that this amount will be greatly increased in 1945.

Our supply of agricultural limestone is greatly in excess of our present demand and will be sufficient to take care of the increased applications.

AGRICULTURAL ADJUSTMENT AGENCY,
B. F. VANCE,
Administrative Officer in Charge.
April 13, 1944.

WESTERN

California THE agricultural use of lime is of very minor importance in California. The latest statistical information we have available is the 1942 report from the State of California Department of Agriculture which shows that for that year the following tonnages of lime were sold for agricultural purposes:

By-product lime	10,365 tons
Hydrated lime	1,044 tons
Limestone, shells and marl	1,222 tons

These tonnages make a very insignificant comparison with the tonnage of lime used in the so-called lime belt.

As far as we know, there has been no difficulty in obtaining lime to take care of what requirements we have.

AGRICULTURAL ADJUSTMENT AGENCY,
DAVE DAVIDSON, *State Committee.*
April 10, 1944.

Colorado THE nature of Colorado soils in combination with climatic conditions does not indicate a deficiency of lime. The needed nutriments are generally supplied by rotation with legumes, tillage operations and the application of such commercial fertilizers as phosphate and ammonium sulphate. Although it appears reasonable that the application of lime might be advisable to a limited extent in a few small areas, we do not believe this offers a possible outlet for any large commercial supply.

COLORADO STATE COMMITTEE,
RAY B. NIMMO, *Acting Chairman.*
April 6, 1944.

Kansas THE quarter of a million tons of agricultural lime used in Kansas in 1943 was more than double the amount used in 1942.

The estimated demand for 1944 is in excess of 1,000,000 tons. We can see no good reason why the demand in 1945 should not exceed that of 1944. Supply has not kept pace with demand even though some producers have doubled their 1943 capacity. New sources are being sought and the present number of producers will probably be doubled in 1944. Some very desirable locations are still available.

We are experiencing little difficulty with priorities for pulverizing equipment and the producers are apparently having no serious difficulty over price ceilings with OPA. Increased production, new sources, man-power and truck transportation present problems of which man-power is the greatest.

We consider this an opportune time for a producer to select his location, assemble his equipment and get into production at the earliest possible date.

KANSAS STATE COMMITTEE,
LAWRENCE NORTON, *Chairman.*
April 8, 1944.

Montana THE application of lime has limited applicability in this state and for this reason a conservation practice for applying lime has not been included in the Handbook of practices for Montana. The use of lime in irrigated sections will become more necessary in the state; however, because of war-time conditions we are not attempting to encourage an increased use of lime.

STATE COMMITTEE AGRICULTURAL ADJUSTMENT AGENCY,
R. J. MCKENNA, *Chairman.*
April 7, 1944.

Oregon MOST of the soils in the Willamette Valley and coast areas of Oregon are acid in reaction and are in need of lime to grow legumes and pastures satisfactorily. However, we have never had access to enough lime at prices that make it economically feasible to nearly satisfy our needs.

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But collections have been lagging. So do your part—help to beat this No. 1 war material shortage. Make sure waste paper is *saved.* Turn it in *now.*

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New York 20, N. Y.

It is estimated that in 1943 we used less than 7,000 tons of lime in the state. This compares with an average of 15,000 to 20,000 tons for the three or four years previous. For 1944 it now appears that farmers will buy 15,000 tons or more of lime. This happens to be all that lime plants in the state think they can produce.

The limiting factors with respect to lime production in this state are the number of lime plants and the cost of producing and shipping the lime. At present there are some lime plants that are not operating to capacity because of man-power shortage.

There are many limestone deposits in the state, some of which have been partially developed, that could be sources of agricultural limestone but that have heretofore been prohibited from operating because of the high costs of operation and shipping. Had it not been for the AAA Conservation Materials Program, the cost of lime to farmers would have been so high as to discourage its use.

Based on past experience it is doubtful that the use of agricultural limestone in this state can be greatly accelerated unless, first, the Conservation Materials Program is continued; second, some encouragement and perhaps assistance be given toward the development of new sources of lime.

We do not believe that WPB policy or OPA regulations have much to do with the use of lack of use of agricultural lime. There is not much doubt, however, but that the man-power shortage, as it affects both lime plants and farmers, has limited the use of lime in 1943 and will limit its use in 1944.

AGRICULTURAL ADJUSTMENT AGENCY,
N. C. DONALDSON, *Executive Assistant.*
April 12, 1944.

Washington THE amount of agricultural limestone applied in the state of Washington in 1942 was 8,300 tons and the estimated amount applied in 1943 was 8,000 tons. In 1944 we estimate that approximately 8,500 tons will be applied and in 1945 approximately the same tonnage.

These estimates are, of course, predicted on the basis that the supply will not be greatly increased. At present the demand exceeds the supply in certain areas. The Oregon Portland Cement Company has a contract with us to deliver agricultural limestone but so far it has been greatly behind in the orders which we have placed. This delay is caused by two factors, one being the lack of sufficient equipment and the other the lack of trucking facilities. We have been informed by the company that it has ordered new equipment and that it should be installed some time this year and that this equipment will greatly increase its output.

We believe that in certain areas, especially in the southwestern part of the state, producers should be encouraged to enter the field. There is one deposit of limestone in particular which we have in mind that is considered to be a very good quality limestone which is not being developed because the owner lacks the finances to successfully put the quarry into operation. This quarry, which is in the heart of the consuming area of southwestern Washington, should be developed if it is at all possible as it is now necessary to haul the limestone considerable distances from other quarries.

The solution to the man-power shortage among the truckers probably means that their wages should be equal to those paid the shipyard workers in the near shipyards. Furthermore, it appears that not only is the manpower shortage restricting the delivery of limestone, but also the shortage of trucks is probably as large a factor as the man-power shortage.

AGRICULTURAL ADJUSTMENT AGENCY,
W. A. WOLF, *Chairman State Committee.*
April 20, 1944.

Wyoming WYOMING soil is generally considered to be naturally high in lime, and the use of limestone is so small that it is very difficult to secure accurate information on its use.

In the study made by state and federal agencies last year, the State Department of Agriculture reported 5,000 tons as having been used in 1942 and that perhaps 7,000 tons should be used in the state to obtain maximum production. I believe the 1942 figure is high since the application of lime is not carried as an AAA practice in this state, and we have never had a request for its inclusion.

WYOMING STATE AAA COMMITTEE,
R. LESTER CROMPTON, *Chairman.*
April 21, 1944.

[AAA representatives in Arizona, Idaho, New Mexico and North Dakota report little use of agricultural limestone in their states.—EDITOR.]

War-Time Mica Boom

The Black Hills of South Dakota, where the discovery of gold attracted a prospector's rush about 70 years ago, are experiencing another war-time boom of a different sort. This time the mineral is mica which has been known to exist in the Black Hills for many years, but there was little activity until the war cut off our supply from India and at the same time increased the demand for mica. With the resulting boost in the market price, the mica industry in South Dakota became profitable.

H. H. Stewart, inspector of mines in South Dakota, predicts that the state will rank as Number 1 in the mica-producing states of the nation for 1943, surpassing North Carolina for the first time. During the first six months of 1943 the Black Hills produced more mica than was produced in the whole year of 1942, which totaled 152,965 pounds and was valued at $95,282. Complete figures for the year just passed are not yet available.

At the beginning of 1942 only three mines were in production in the Black Hills district. Mica now is being taken from over 60 properties in the area, with four mica rifting plants being operated at Custer and one at Hill City, a neighboring town.

ENLIST YOUR SCRAP

Not an ounce of iron or steel should take a rest today. Your rule is: *If it isn't working, scrap it!* Send it to war.

Half of every gun, tank, and ship is scrap. *Your* scrap is needed.

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Figure 1.

Acetylene Torch and Welding Rod Restore Lime Kiln to Service with Minimum Delay

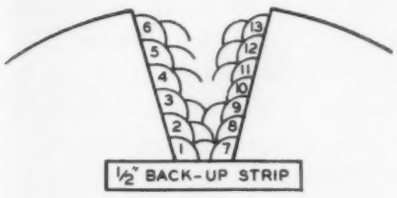

Figure 2.

another ON THE SPOT report

ONE of many outstanding instances where welding was utilized to prevent serious delay and expense has been reported by the Cutler-Magner Company, lime manufacturer of Duluth, Minnesota. A large one-piece cast-steel tire of a lime kilm was restored after the piece had cracked.

The importance of quickly effecting a repair to this part can be appreciated by the fact that the operation of local paper mills, sewage-disposal plants and public water works in the Duluth area is dependent upon the lime produced by the 300-ton kiln.

The crack, which occurred directly across the face of the 11-foot, 10-inch diameter tire as shown in Figure 1, extended through the 5-inch thickness of metal and down the sides until it had practically separated the metal at this point.

Instead of attempting to purchase a new tire which, even had it been obtainable, would have cost $1,750 and hundreds of dollars for installation, the company proceeded to restore the cracked portion into a single unit by fusing the bill with the electric arc, requiring only about one day to complete the job as against a shutdown of several weeks which would otherwise have been necessary.

The cracked tire was first veed out with an acetylene torch, using a chisel and air hammer to finish the operation. Next, the broken section was pre-heated by means of a fuel-oil torch shown at the center of Figure 3. A temperature of 300 degrees F. was maintained throughout the entire welding operation by this method.

The veed-out section, ready for welding, measured approximately 5 inches across the vee by 18 inches across the tire width. After placing a ½-inch thick backing strip at the base of the vee, as shown in Figure 2, successive layers of weld beads were applied, in the sequence indicated by numerals, to fill in the opening. This procedure for applying the weld metal prevented possible distortion or shrinkage that sometimes results when a large weld of this kind is made.

Figure 4.

Electrodes used for the job were of American Welding Society specifications E-6012 in the ¼-inch diameter size. About 40 pounds of weld metal was required to complete the repair, in approximately 6 hours welding time.

The finished job shown in Figures 3 and 4, stronger than the original, was ground down to the proper dimensions by means of a portable grinding wheel set on a template so that the finished surface would correspond to the contour of the tire.

The illustrations and the data relative to this welding job were supplied by the Lincoln Electric Company.

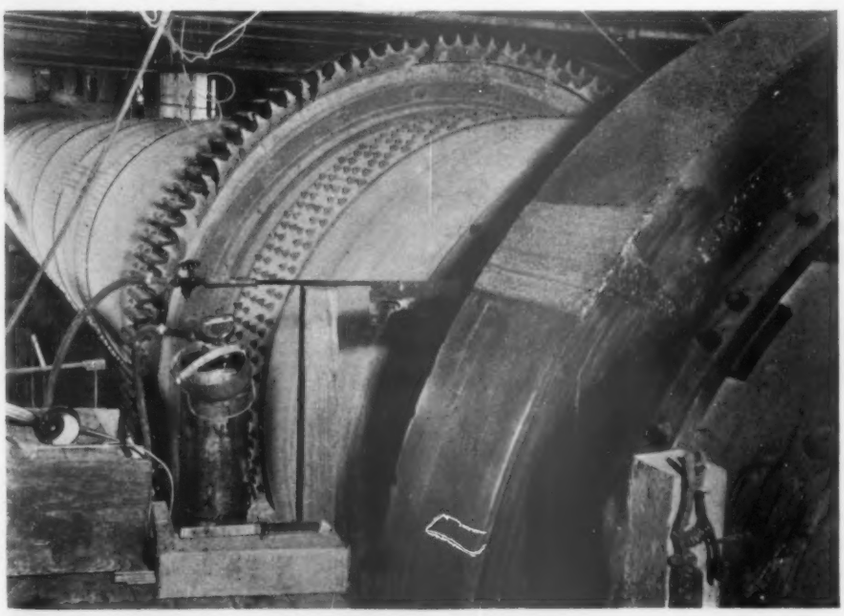

Figure 3.

For more efficient drilling

use JACKBITS

Only Ingersoll-Rand Jackbits cover a complete range of sizes from 1⅜ to 4½ inches. Included in this group are special bits, some developed for the hardest rock . . . some for abrasive or sticky ground . . . some for ground that tends to rifle or that binds the bit . . . some for ground that requires maximum bit clearance. From the many different sizes and designs, let us help you select a bit that will give you the best drilling efficiency in your rock. On one job, for example, the drilling rate increased from 16 inches to 22 inches a minute when Jackbits were put to work.

Then, too, only Jackbits are backed by a complete line of reconditioning equipment which consists of Hotmills and Grinders for resharpening bits, a Box Tool and Die Head for the easy conversion of lathes for Jackrod threading, and numerous Furnaces and Accessory Equipment. The great degree of accuracy made possible by I-R resharpening equipment permits the use of smaller-gauge bits. This leads to surprising increases in drilling speed. Yes, you will have more efficient drilling when you use Jackbits.

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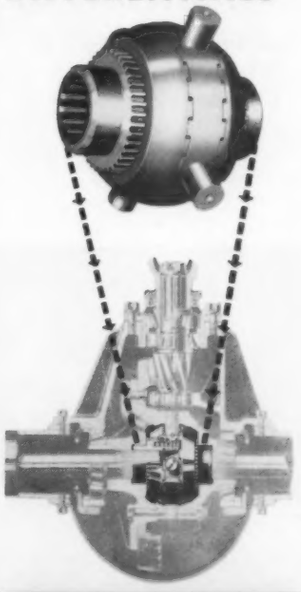
JACKBITS OFFER THE WIDEST RANGE OF DESIGNS AND SIZES

SWEETEN YOUR PROFITS
AS YOU SWEETEN FARM LAND
WITH
THORNTON
Automatic-Locking
DIFFERENTIALS

You'll agree that to do a good, thorough job of lime spreading or fertilizing, your truck must keep moving through mud, muck, and over slippery ground conditions.

Maybe you're a contract spreader, or a farm owner or operator. Maybe you have contract schedules to meet, or must keep up with general farm work. In any event you'll take your hat off to a truck in whose rear axle a Thornton *Automatic-Locking* Differential has been installed . . . because both wheels *must* rotate when power is applied.

Watch how the Thornton equipped truck out-performs others that skid, slew or stall. Note how it can back up, or make right or left hand turns. Easily installed . . . And it's really automatic. Find out how farm trucks operate more profitably with the Thornton *Automatic-Locking* Differential. Send for folder today.



Production Models Now Available with Limitation Order Certificate L-158

Model 10G1 for Ford 1½ ton trucks with single speed axles.
Model 20G1 for Chevrolet 1½ ton trucks with single speed axles.
Model 50G1 for International Trucks (Model K-3) with single speed axles.
Model 50G2 for International Trucks (Models K-4 and K-5) with single speed axles.
Model 50J1 for International Trucks (Models K-6 and K-7 or earlier equivalents) with single speed axles.

BUY MORE WAR BONDS

WRITE FOR PARTICULARS AND PERFORMANCE DATA

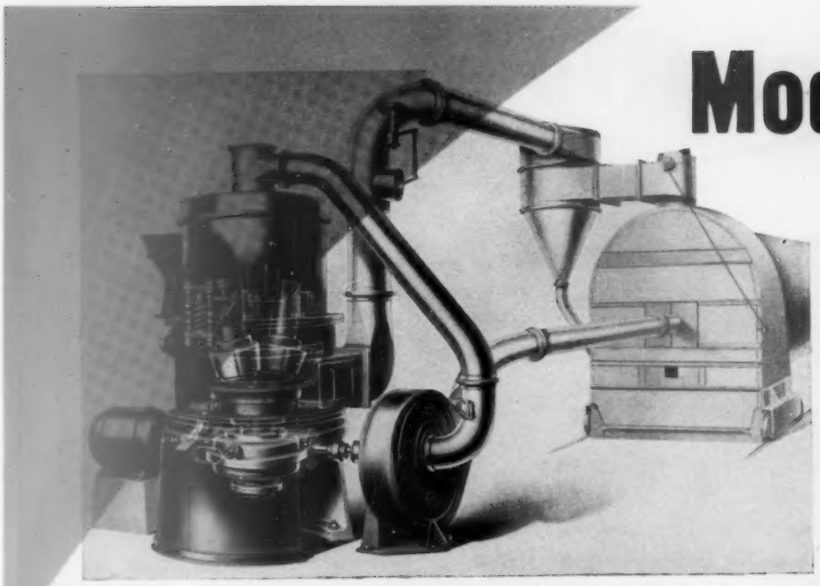
THORNTON TANDEM COMPANY

8771-A GRINNELL AVENUE • PLaza 9700 • DETROIT 13, MICHIGAN

Make Big Trucks Out of Little Ones with the THORNTON *Four-Rear Wheel* DRIVE

In U. S.: Sold by TRUCKSTELL DISTRIBUTORS • In Canada: H. V. WELLES, LTD., Windsor, Ont.

Modernize Your



RAYMOND

For Kiln Firing Efficiency, Use the Raymond BOWL MILL

This direct-firing unit is the answer to your kiln problems. Handles any grade or moisture coal and "dries in the mill." Maintains uniform grind . . . provides easy control. Results in increased kiln production, improved lime quality, minimum attention, reduced fuel and maintenance costs.

Ask for Catalog No. 43.

Complete Line of Equipment for Drying, Grinding, Separating, Direct-Firing, Conveying and Cooling. Refer your problems to Raymond engineers.

For High Purity Hydrated Lime . . . Use the Whizzer Type Automatic Pulverizer

It handles the material through the full cycle of production: — Receives lime from hydrate bin, disintegrates and classifies the material, rejects hard particles or impurities, and delivers a uniform finished product of super quality. Varying whizzer speed controls classification from agricultural lime to superfine chemical hydrate at 99.5% passing 400-mesh.

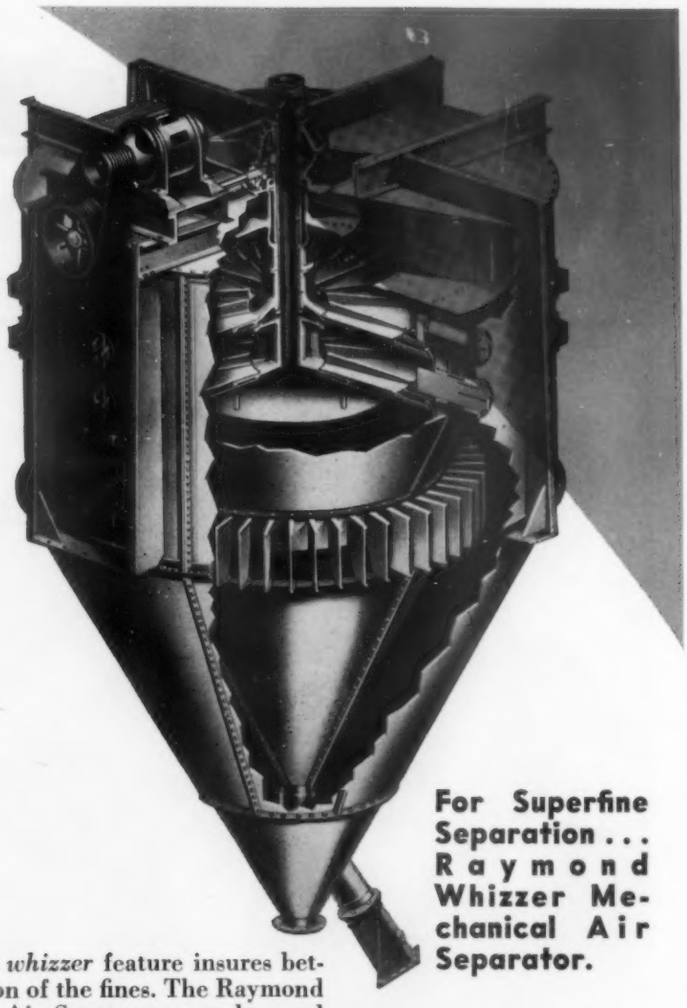
Ask for Catalog No. 37.

RAYMOND PULVERIZER DIVISION

Combustion Engineering Company, Inc.

1321 North Branch Street Chicago 22, Illinois

Lime Production



For Superfine Separation . . . Raymond Whizzer Mechanical Air Separator.

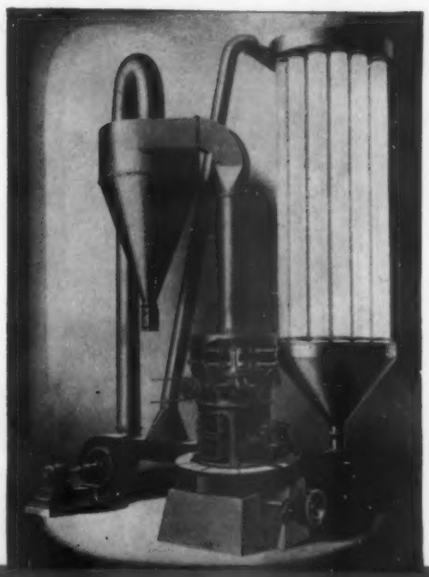
The *double whizzer* feature insures better separation of the fines. The Raymond Mechanical Air Separator may be used in combination with the Automatic Pulverizer to obtain much larger capacities.

Ask for Catalog No. 45.

EQUIPMENT

Bevel Mills, Roller Mills, Imp Mills, Screen Mills, Automatic Pulverizers, Mechanical Air Separators, Dust Collecting Systems, Laboratory Units.

For Pulverizing: — Burnt Lime, Dolomite, Agstone and Limestone Fillers . . . Raymond ROLLER MILL

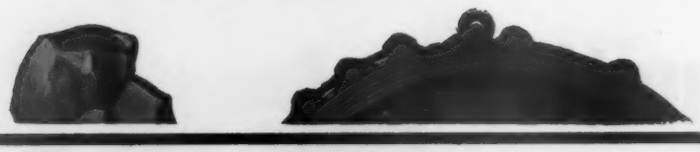


Heavy-duty grinding . . . where you require big tonnages at low costs . . . the machine that "can take it" is the Raymond High Side Roller Mill. Built with double whizzer separator for wide range fineness control. Throw-out attachment, optional, for removing impurities and refining the product.

Ask for Catalog No. 51.

Sales Offices in all Principal Cities

Canada: Combustion Engineering Corporation, Ltd., Montreal



Williams Hammer Crushers

Handle Larger Rock :: 50% Less Investment :: Better Product

The "Slugger" which reduces "one-man" size limestone to 1", ¾" or agstone.

Feed opening of the "Mammoth" crusher which crushes 48" rock to 1" in one operation.

A Size for Every Job

The "Mammoth" crushes 48" rock to 3", 2" or 1" in one operation. Takes the place of a primary breaker and recrusher.

The "Jumbo" reduces 20" to 30" rock to 1¼" and smaller.

The "Slugger" crushes screen rejects or "one man" size rock to 1", ¾", ½" and finer.

The "NF" type is supreme as a recrusher for reducing 5" stone to 1", ½" or agricultural limestone.

The "Non-Clog" for crushing wet muddy rock. Cannot be clogged.

Fine Grinders • *Air Separators* • *Dryer Mills*

The Williams Patent Crusher and Pulverizer Co.

802 St. Louis Ave. ST. LOUIS, MO.

Sales Agencies in All Principal Cities Including

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THE WILLIAMS PATENT CRUSHER & PULVERIZER CO. ST. LOUIS, MO. U.S.A. TRADE MARK

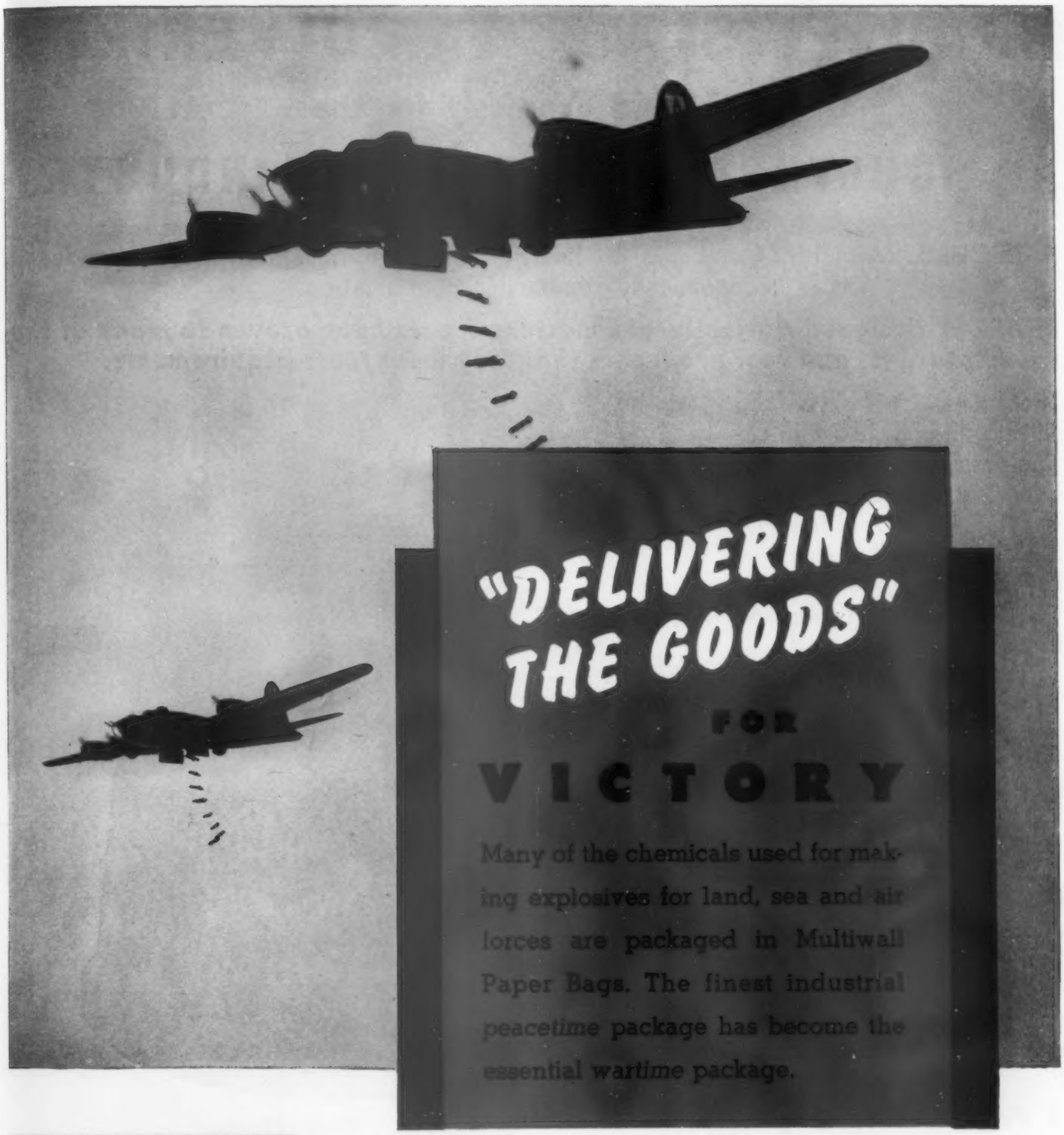
REG. U.S. PAT OFF

Williams

OLDEST AND LARGEST BUILDERS OF HAMMERMILLS IN THE WORLD

Williams

PATENT CRUSHERS GRINDERS SHREDDERS


"DELIVERING THE GOODS"
FOR
VICTORY
Many of the chemicals used for making explosives for land, sea and air forces are packaged in Multiwall Paper Bags. The finest industrial peacetime package has become the essential wartime package.

Multiwall Paper Bags are required for industrial shipments of food products, chemicals, fertilizers, and construction materials — for domestic use and overseas to our armed forces and civilian populations of allied nations and occupied countries.

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BRADLEY'S *Newest* PULVERIZER

designed expressly for the

AGRICULTURAL LIMESTONE INDUSTRY

AGRICULTURAL LIMESTONE must be finely ground, uniform in mesh size and produced economically with the minimum of labor.

BRADLEY-designed Agricultural Limestone Plants have proven to many of the world's largest and best producers that they meet these requirements.

The BRADLEY HERCULES MILL built in 3 sizes with capacities for 8 to 40 Tons per hour is unquestionably the finest Pulverizer obtainable and the only mill on the market designed specially for the Agricultural Limestone Industry

LOW POWER CONSUMPTION

—LARGE OUTPUTS—

EXTREMELY LOW MAINTENANCE COST

—LABOR SAVER—

Feeder is equipped with an Automatic Electric Control that provides the maximum output of a uniform finely ground finished product, eliminating manual operation.

A Pulverizer of simple, rugged design adaptable to the small or large plant.

TYPE "B" JUNIOR HERCULES MILL
With Casings and Screens partially removed

BRADLEY has manufactured Pulverizing Machinery since 1891 and specializes in Agricultural Limestone plant engineering and machinery.

Send for catalog.
Our Engineers are at your service.

BRADLEY PULVERIZER COMPANY

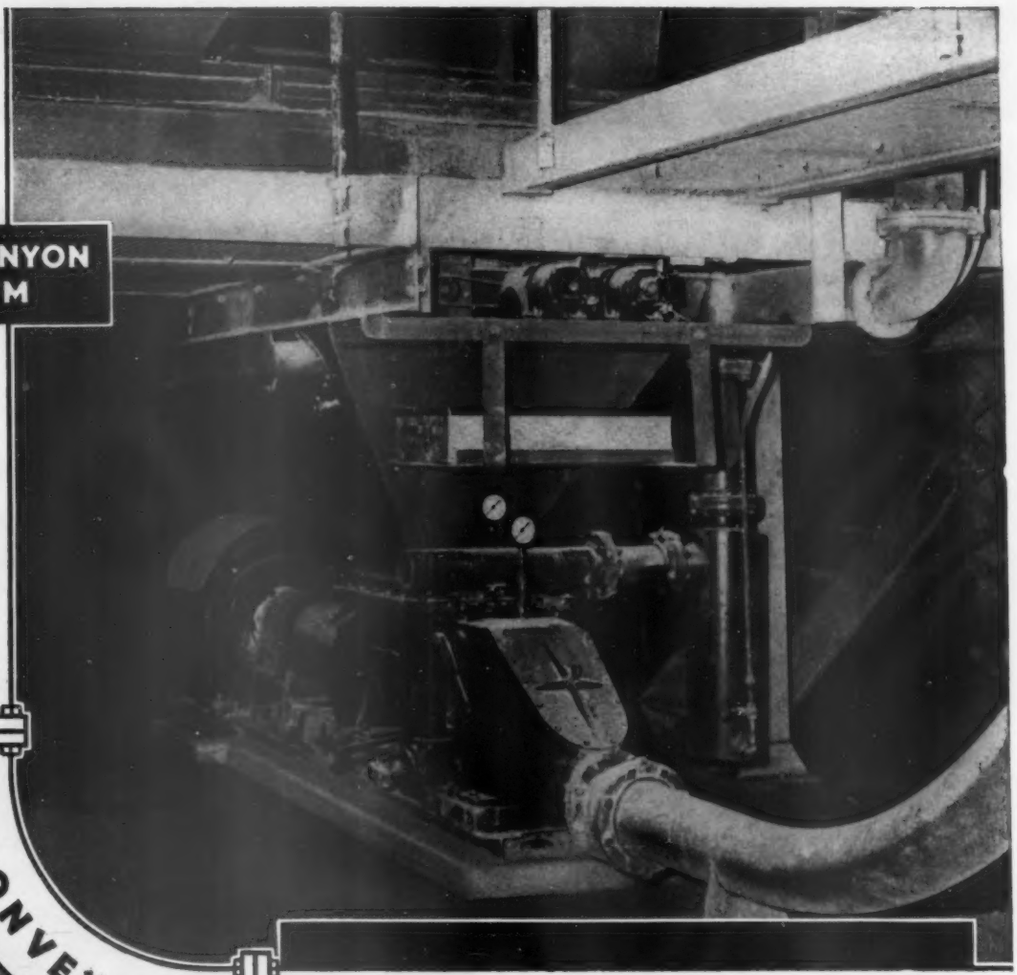
New York

Works and Sales Office
Allentown, Pa.

Worcester, England

CLEAN • SAFE • LOW COST CONVEYING

FULLER-KINYON SYSTEM



THROUGH PIPE LINES

SOME MATERIALS CONVEYED BY FULLER-KINYON SYSTEMS

Arsenic dust
Asphalt filler dust
Bag fume
Baroid
Barytes
Catalyst
Cement (Portland)
Cement raw materials
Clays (dried)
Colox
Copper converter dust
Dextrine
Dolomite
Fuller's earth
Gypsum (raw)
Lime (quick)
Magnesite
Manganese Dioxide
Ore (pulverized)
Rock dust
Siliceous Powder
Starch (Pearl)
Starch (Powdered)

The Fuller-Kinyon System is an outstanding example of simplicity of design, having many inherent advantages for the conveying of dry pulverized materials, some of which are:

CLEANLINESS—Materials conveyed through standard-size pipe lines, underground or overhead. No dust collectors necessary.

SAFETY—Explosion proof . . . air for conveying insufficient to support combustion. No mechanical or dust hazards.

LOW-OPERATING COST—No links, buckets or drags requiring frequent attention, replacement and repairs. Only one moving part . . . the screw in the pump, which can be replaced with a minimum loss of time.

ELIMINATES STRAIGHT-LINE CONVEYING—Cuts corners to shorten conveying distances . . . anywhere a pipe line can be placed: horizontally, vertically, up or down hill.

Put your conveying problems up to us . . . we're here to help and suggest equipment best suited to your needs.

P-67

FULLER COMPANY

CATASAUQUA—PENNSYLVANIA

CHICAGO, 3 Marquette Bldg. | WASHINGTON, 5, D. C. Colorado Bldg. | SAN FRANCISCO, 4 Chancery Bldg.

Faster LIME Production

Record output and economy figures in lime plant operation, combined with a uniformly high quality product, are assured by the YORK-KUNTZ Vertical Lime Kiln.

This ultra-modern and time-proved system of lime burning offers the following outstanding advantages:

Continuous charging, flow and discharge controlled for complete burning.

Controlled central combustion.

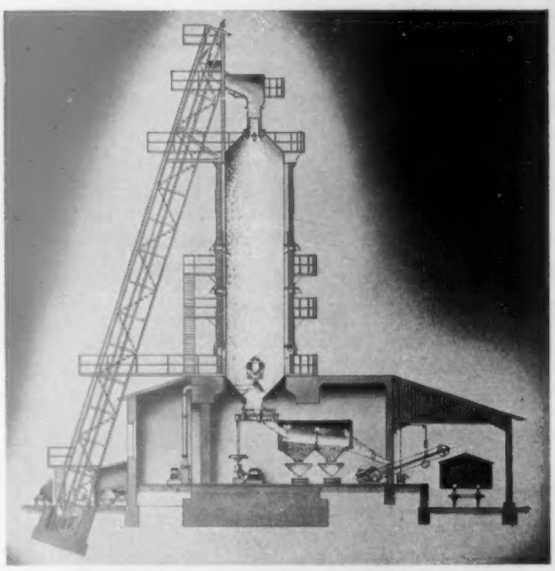
Automatic operation, requires only one man per shift.

Lime discharged in large pieces, with separation and recovery of fines.

Vertical design requires less space, minimizes handling, and reduces power requirements.

Provided for mixed feed, gas or coal firing.

Purity of product limited only by stone and fuel used.



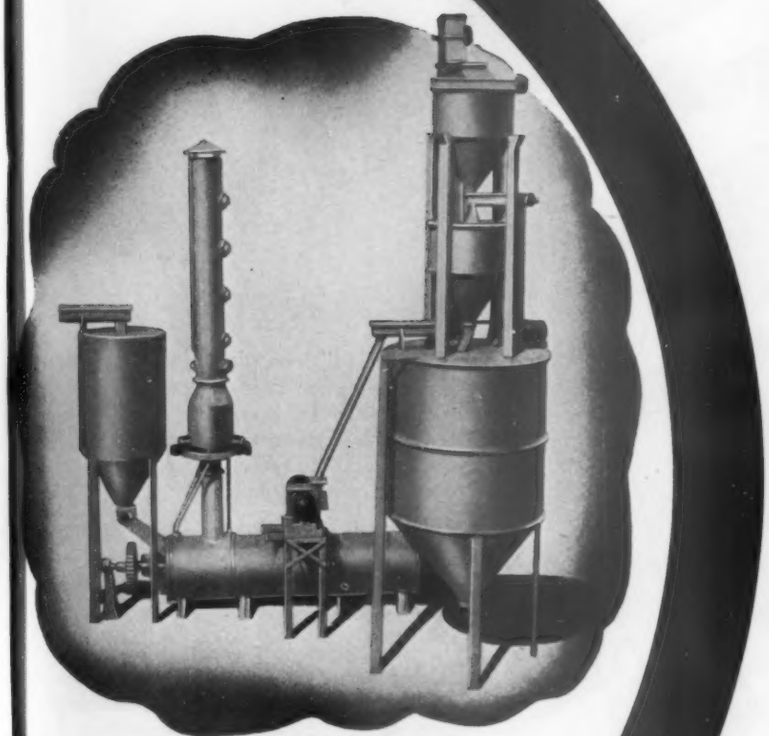
Write for information on these McGann Products:

LIME PLANTS COMPLETE	SHAFT KILNS	HYDRATORS
DRYING MACHINERY	ROTARY KILNS	TANKS
GREY IRON CASTINGS	SUGAR MACHINERY	BINS

Special Machinery from Engineer's Designs

Better LIME Products

KUNTZ



Save lime fines

Automatic

The KUNTZ gravity system of lime burning is the *only known method* which completely eliminates the loss of high grade fines, prevents dust nuisance, and guarantees absolute control of product.

Here are some profit-making features which explain the growing popularity of the KUNTZ system among informed producers:

Costs less to install and operate than any other system.

Saves—and uses—heat of hydration.

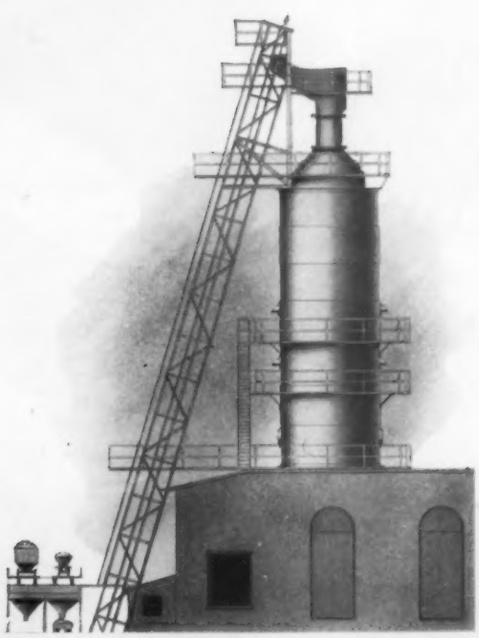
Lime fines saved by patented dust control.

Multiple classification for fineness and purity of product performed in one operation.

Product control accomplished with less horsepower and less space.

System is completely automatic, with one-man operation.

System applicable to any type of hydrate plant, for either batch or continuous process.



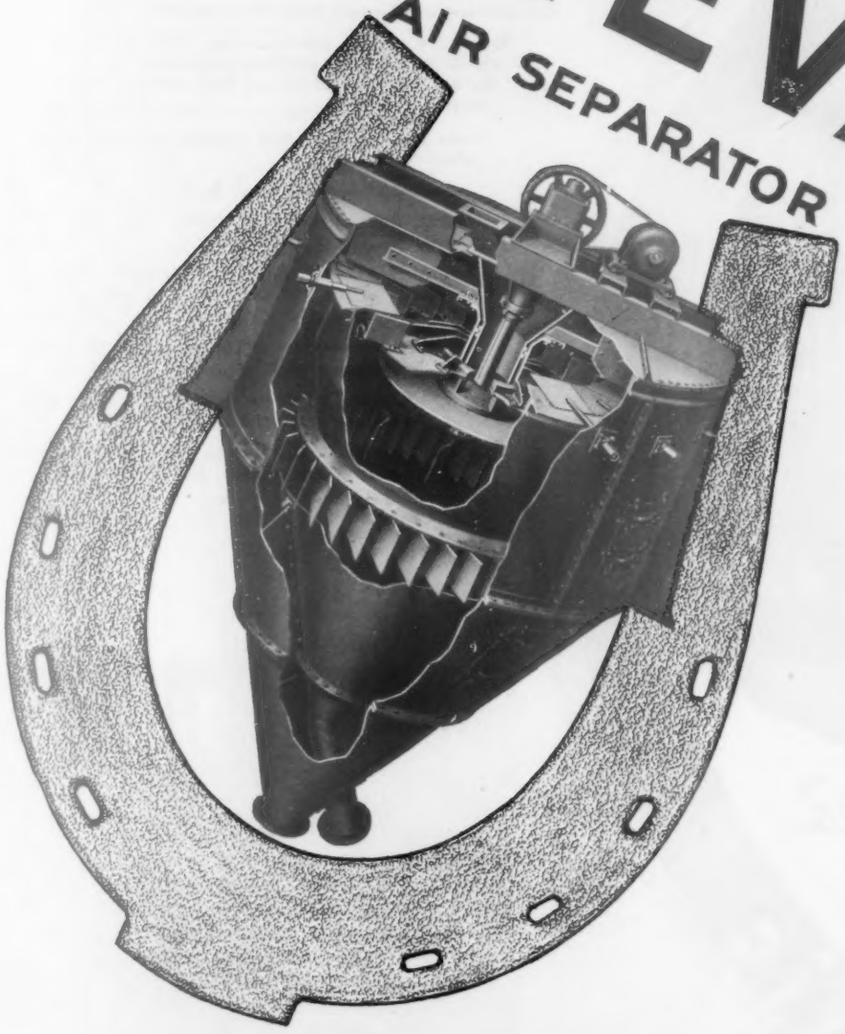
LIME & HYDRATE PLANTS CO.

Associate McGANN MANUFACTURING COMPANY, INC. *York, Pa.*

STURTEVANT

AIR SEPARATOR

Profits aren't a matter of luck in Lime Sizing



A "booming" lime plant doesn't prove that the owner carries horseshoes — chances are he operates a STURTEVANT Air Separator in closed circuit with a STURTEVANT Ring—Roll mill or other grinding unit.

It's the ideal combination for setting output and economy records, increasing capacities up to 300%, with power saving up to 50%.

Our Air Separators can be easily and quickly adjusted to deliver an accurately sized, uniform product, ranging from 40 to 350 mesh. Capacities, 1 to 50 tons per hour.

Industry acclaims this remarkable machine. Hundreds have been installed on approval and accepted.

Write for Information

STURTEVANT MILL CO. HARRISON SQUARE BOSTON 22, MASS.

POSITIVE

Lime Dust Control

TYPE N ROTO-CLONE is especially suited to the control of lime dust created at kilns and hydrators. Because of its distinctive construction, involving no restricting passageways through which collected materials must pass, chances for accumulation and stoppage are eliminated. Its high efficiency is obtained by a stationary impeller with intricate sinuous passage in which centrifugal force and thorough scrubbing of the air result in effective and continuous precipitation of the dust. Available in a wide range of sizes and capacities from 1,000 to 25,000 c. f. m. Complete information on the Type N Roto-Clone will be sent on request.

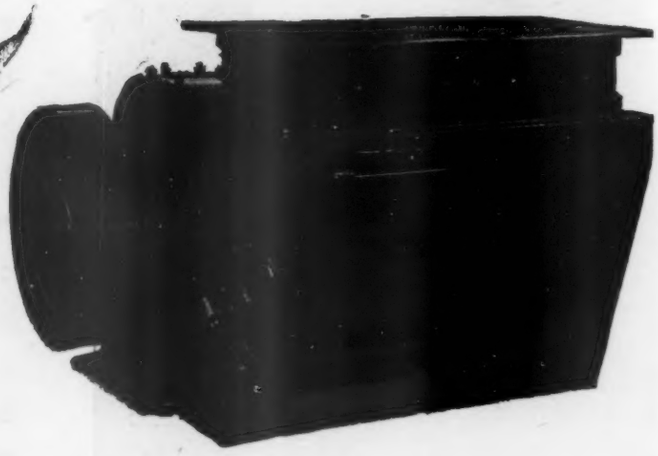
TYPE W
ROTO-CLONE
is widely used for the collection of rock dust created at crushers, screens, transfer points, etc., in the rock crushing and mining industries. Write us for free bulletins —there's no obligation.

BUY WAR BONDS

AAF
AMERICAN AIR FILTERS

AMERICAN AIR FILTER CO., INC.
INCORPORATED
192 CENTRAL AVE. LOUISVILLE, KENTUCKY
IN CANADA, DARLING BROTHERS, LIMITED, MONTREAL, P. Q.

FOOD Production ... depends on LIME Production



AMERICAN Crushers

Since "food will help win the war", it is evident that final victory will largely depend on our farm production, which in turn depends on *lime* production.

Agricultural limestone is needed in tremendous amounts to maintain full soil productivity for bumper crops.

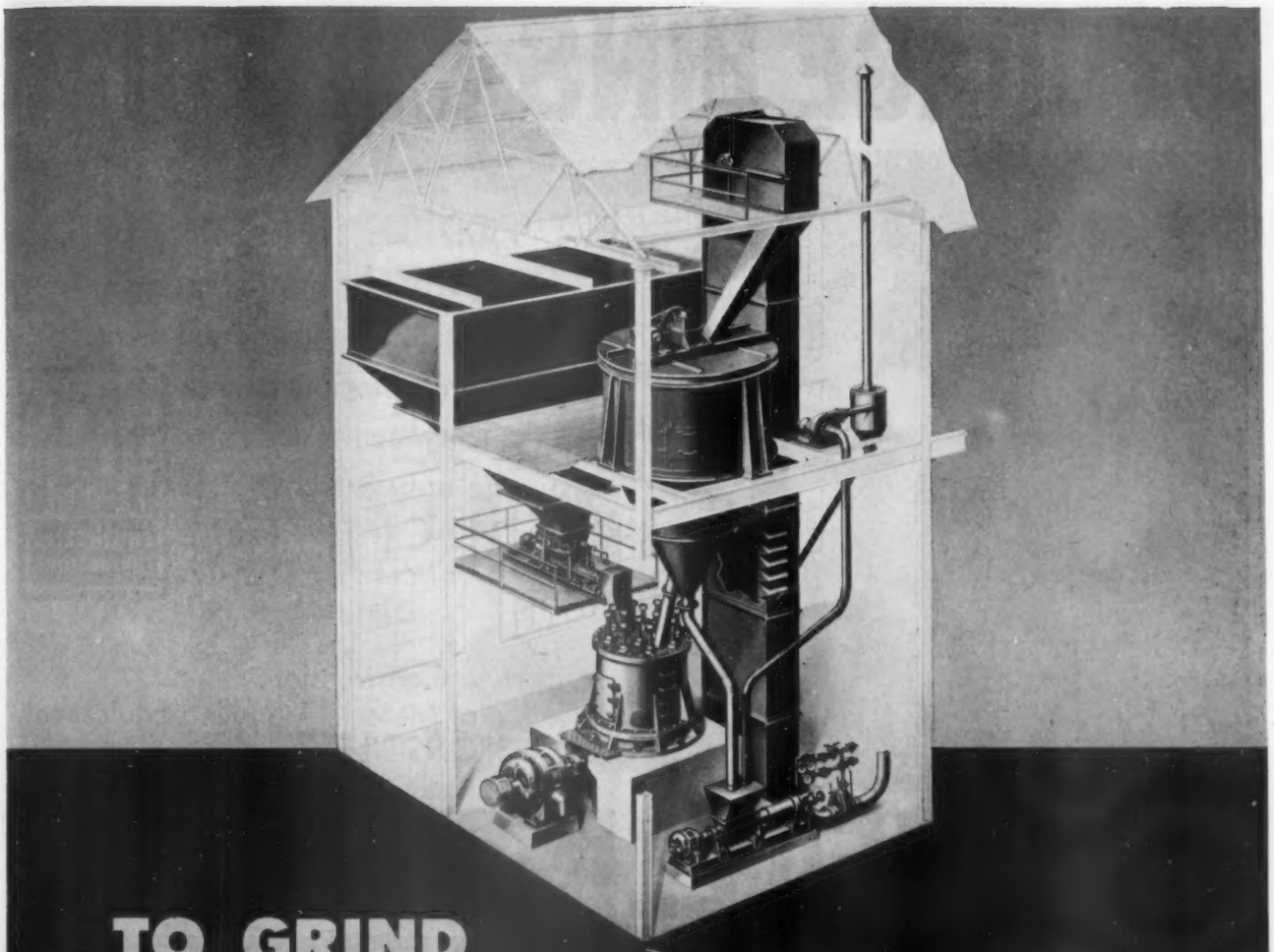
Agstone producers will find it easier to meet current and future demands for this vital material by producing agstone with AMERICAN Crushers.

AMERICANS assure record capacities of a uniform product, trouble-free operation, and record low power and maintenance costs.

Write for Bulletin.

AMERICAN PULVERIZER COMPANY

1259 Macklind Ave. **St. Louis 10, Mo.**



TO GRIND AGRICULTURAL LIMESTONE *Economically . . .*

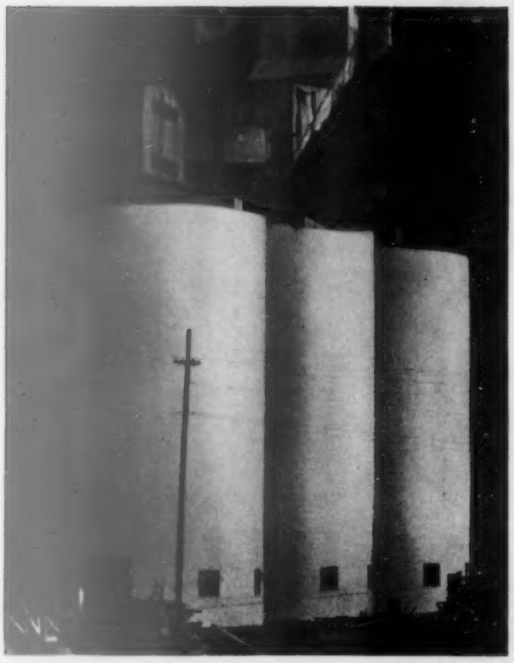
Install B&W Pulverizers

- Ball-bearing principle of grinding.
- High availability.
- Maximum overall economy.
- Integrity and responsibility of manufacturer assure satisfactory operation.

BABCOCK & WILCOX

THE BABCOCK & WILCOX CO.
85 LIBERTY ST., NEW YORK 6, N. Y.

STORAGE BINS TRUE TO *with* SLIDING FORM



Speed plus Quality results Economy

ADD UP years of experience in storage construction and material handling equipment, plus technical ingenuity and quality construction. The answer? RESULTS!

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Bulk Storage Construction.
Installation of Material Handling Equipment.
ONE RESPONSIBILITY.

W. B. NEILL, INC.

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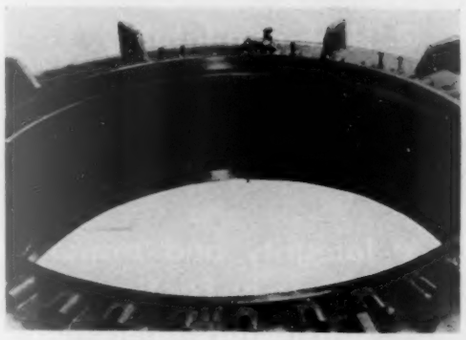
MECKUM
Lined Type Pump Shell



MECKUM SUPER FEATURES

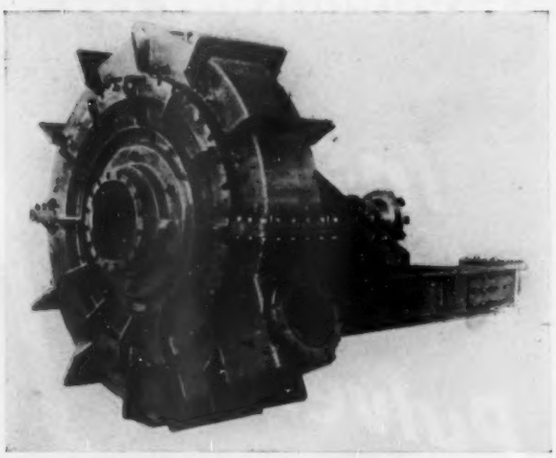
- ★ Lower pump shell costs
- ★ Accurately machined, leak-proof joints
- ★ Pump always perfectly aligned
- ★ Shell suitable for any dredge pump
- ★ Greater strength and wear resistance

Write for Information

. . . a 5-Star Performer for Sand and Gravel Operators

Here's the *big cost-reducing unit in* dredging equipment—the MECKUM Two-Piece Welded Steel Pump Housing, lined with alloy iron segments.

MECKUM liners form a self-locking arch when in position, and are easily installed or removed, saving pump replacement costs.

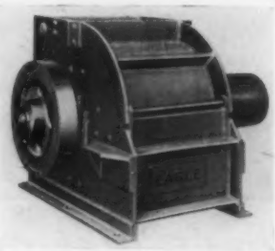


Complete MECKUM Pump

MECKUM ENGINEERING, INC. 53 W. Jackson Blvd. CHICAGO, ILL.

"Down on the Farm" folks appreciate the **EAGLE** *pulverizer and Impact Breaker*

BIG CROPS NEED AGSTONE—lots of it. That's why crushed rock producers in farming areas prefer this EAGLE Hammermill, which reduces limestone to a fine agricultural product in one operation. Also adjustable to supply top quality construction and road stone. A high-capacity, economical unit.



EAGLE

JAW CRUSHERS
IMPACT BREAKERS
PULVERIZERS
CONVEYORS
LOADERS

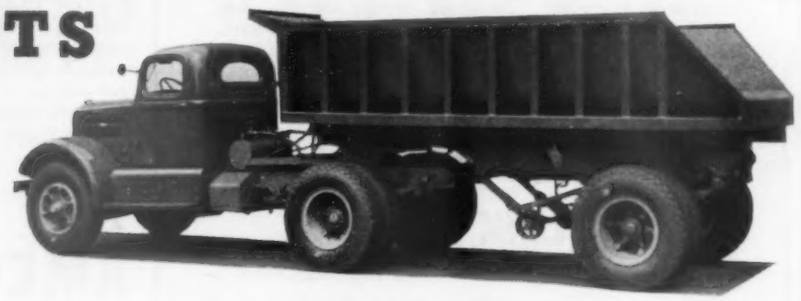
Territory open for responsible distributors
Write for prices and detailed specifications.

EAGLE CRUSHER CO., INC. **Galion, Ohio**

DUMP UNITS

FOR ALL TYPES OF MATERIAL HAULING

MODEL 5SF Semi-Trailer Dump Unit with special 10 cu. yd. rock body for limestone quarry service.



TRUCK ENGINEERING CORPORATION
CLEVELAND, OHIO

NEW LEADER Truck Body Type

LIME SPREADERS

Can Now Be Purchased Without Triple AAA Certificates or Priority

New • Improved • Heavier in Construction and Reinforcement • Built to Stand Hard Usage • Heavier Shaftings, Bolts, etc.

NEW LEADER Lime Spreaders can now be purchased with extra heavy duty pintle type conveyor chain. Positive-feed, self-unloading spreader will spread wet or dry lime uniformly from 30 to 45 feet in width.

Write today for latest catalog

HIGHWAY EQUIPMENT COMPANY, INC.

Manufacturers of the World's Most Complete Line of Spreaders, Including Lime Spreaders, Sand and Cinder Spreaders, Chip Rock, Clay and Dirt Spreaders.

CEDAR RAPIDS, IOWA, U. S. A. Phone 32017-32018

GRUENDLER CRAFTSMANSHIP
Serving Industry over 50 Years

150 TO 200 TONS PER HOUR, CRUSHING HARD ROCK

Steam Shovel rock reduced to 5" to 6" minus in one operation.

These heavy plate steel constructed roller bearing jaw crushers have tremendous crushing power, take most severe punishment.

ROLL CRUSHERS
PULVERIZERS
CONVEYORS
CRUSHERS
FEEDERS
MIXERS

The complete weight of above crusher is 54,200 lbs.

Mfgrs. of Portable Jaw or Hammer Crushers and Heavy Roll Crushers

Bulletin mailed on request.

GRUENDLER

CRUSHER and PULVERIZER CO.
2915-17 North Market St., ST. LOUIS (6), MO.

Flink Spreads Wet or Dry Lime Faster — at Lower Cost —

There is no other lime spreader on the market comparable to the Flink. Designed strictly for the commercial spreader. No helper is required on the back as the Flink is operated by the driver of the truck.

Does not limit use of truck. Fits on end like tail gate.

Spreads evenly wet or dry material up to 1" in size, up to 28 ft. in width. Built for hard use. Time tested. Hundreds in use throughout America. Write for complete literature.

The **FLINK CO.** Streator Illinois

For particulars write our nearest representative:

WICO SALES, 2924 N. Western Avenue, Chicago 18, Illinois
G. W. CLEMENTS, 3050 Freemont St., Columbus 4, Ohio
TULSA MACHINERY CO., Tulsa, Oklahoma
NORTHLAND DELUXE EQUIPMENT CO., Janesville, Wisconsin
WISCONSIN OIL & EQUIPMENT CO., 34 Park Ave., Oshkosh, Wis.
C. R. HANSON, 2303 Grand Ave., Kansas City, Missouri
H. C. JORDAN, Irvington, Kentucky

36 Years Experience + Vision for Tomorrow

Make* "American Rubber" *Products

Timed for Today's Needs

It's this long experience . . . plus our practice of always looking ahead . . . that have enabled us to meet the emergencies brought about by this global war.

• Lightning Ribbed Center Conveyor Belt has yet to meet a moisture problem it could not solve. As for tonnage, it handles the most per dollar of cost.

Experience, plus Vision, have enabled us to develop Ar-Polene, the American synthetic, and to use it in such a manner that, in many cases, it is superior to natural rubber.

Now, just as in normal times, you can depend upon "American Rubber" products for today's needs, and for tomorrow's.

The
AMERICAN RUBBER
Manufacturing Company

Factory and General Offices:
Park Avenue and Watts St., Oakland 8, California

ARNOLD & WEIGEL
Incorporated
LIME PLANT ENGINEERS
Located at
WOODVILLE, OHIO, U.S.A.

Advertise your wants and surplus equipment in

PIT QUARRY

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Subscribers who may no longer have need for their copies of the April, 1944, issue of PIT AND QUARRY will greatly oblige the publishers if they will write at once stating how many copies they are willing to sell back to us at 50 cents each. An exceptional demand for the April issue, far beyond the number anticipated, makes this appeal necessary.

Circulation Department

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538 South Clark St. Chicago 5, Ill.

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Idlers (belt)
Pulverizers
Portables
Screens
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Weigh Feeders

Chains
Car Pullers
Conveyors
Crushers

COVERS EVERY PHASE OF MATERIAL HANDLING — REDUCTION

Jeffrey offers a broad service to the stone products industry. The name stands for mechanical efficiency and the more difficult and varied the job, the greater the need for the diversified line of Jeffrey material handling and reduction units, capable of carrying through every step of the process.

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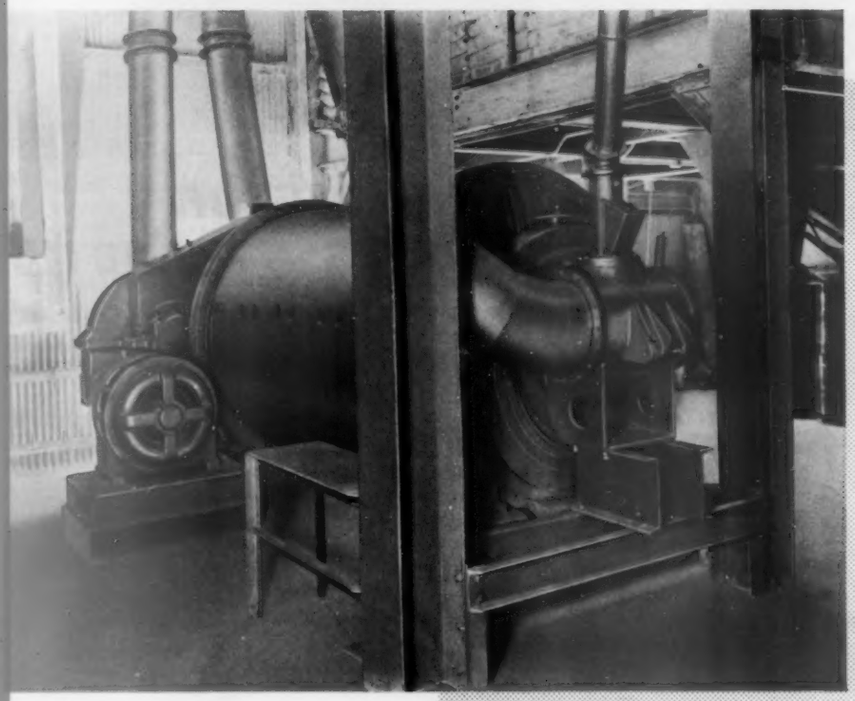

produces

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TONS PER HOUR

with a feed of

—¾" limestone and dust.

The product is collected in three cyclones, and is:

(1)	5 Tons	Per Hour,	80%	—200	Mesh
(2)	+1 "	" "	, 92%	—200	"
(3)	400 lbs.	" "	, 99.8%	—325	"

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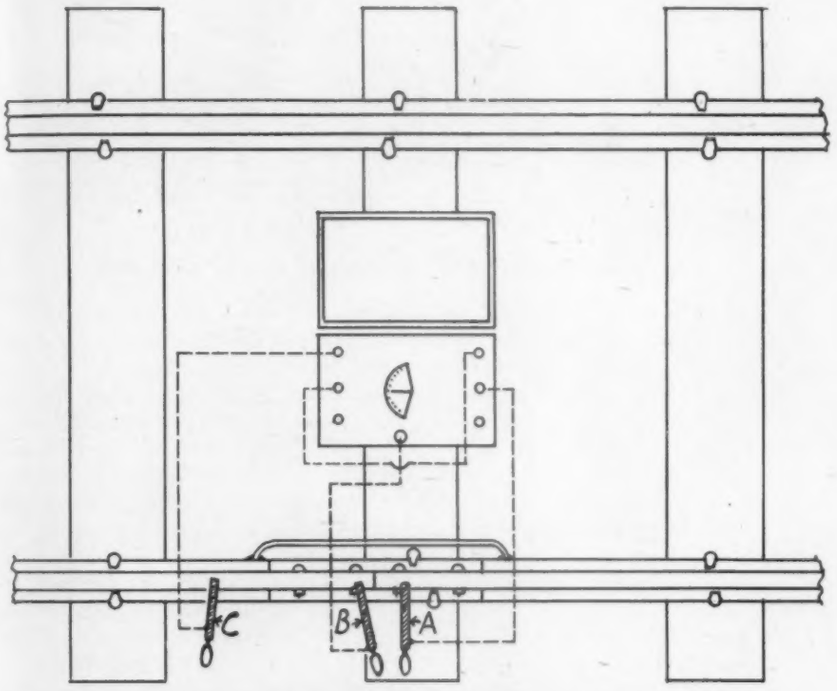
GOOD RAIL BONDS CUT POWER COSTS BY LOWERING RETURN-CIRCUIT RESISTANCE

THE ever-increasing use of electric power, principally direct current, for haulage, pumping and scraper service necessitates a study being made of the bonding system in use. For all too frequently detailed attention is paid only to the installation of the positive or incoming side of the circuit, while the negative rail return, being usually out of sight and thus out of mind, is grossly neglected. Yet, for a system to function economically, all the current must flow back to its source over a low-resistance conductor, this being an instance where the whole chain is no stronger than its weakest link.

To establish a set-up to determine the resistance of a track's two-rail circuit, we assume the total resistance to be the sum of the rail resistance plus the resistance of the bonded or welded rail joints, which is best expressed as being "equivalent feet of rail." It works out this way: in establishing the resistance of a mile of rail, the rail's resistance plus the resistance of the joints quite closely equal the average resistance of 1.10 miles of theoretical jointless or continuous rail. Where bonding is particularly bad, the value of 1.30 to 1.60 miles may be used.

Economical and efficient operation is achieved by initial painstaking installation of joint and cross bonding with particular attention being paid to shunting bonds around all switches and frogs. In this connection it may be stated that good workmanlike appearance can not be accepted as an infallible criterion for judging the work, since frequently copper bonds are clamped through oversize or corroded holes in the rail ends or the clamping on, or driving in, of the new wedge-type lugs suffers from using insufficient force.

By P. C. ZIEMKE



Sketch and photograph of device for testing conductivity of rail bond. A, B and C in sketch indicate the wood-handled files.

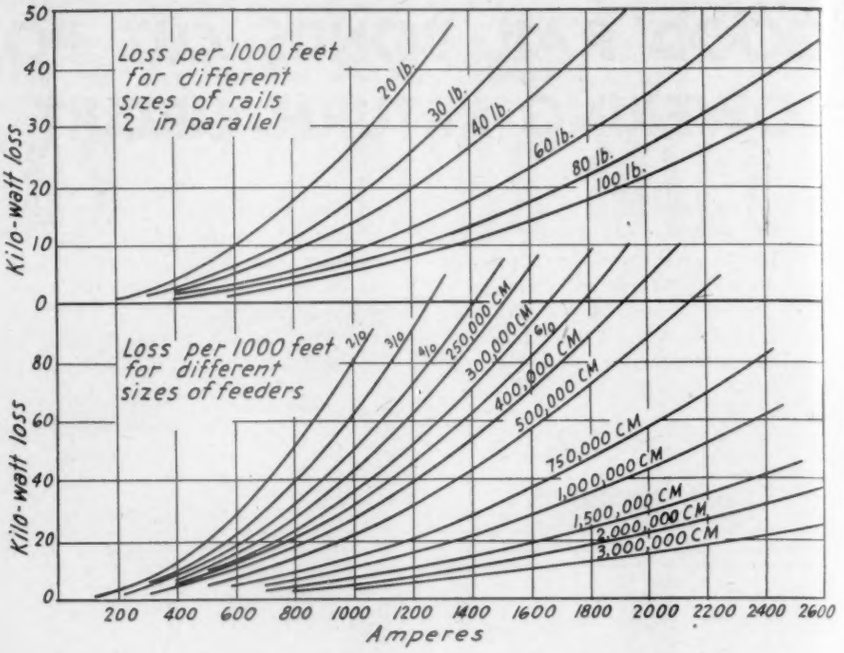
Where the welding method of attaching bonds is employed, care must be exercised in thoroughly cleaning the metal at the point of attachment and using the proper composition of welding rod and arc amperage plus laying on of the weld in even, uniform layers. And, finally, since mine track is subjected to extremely hard use, where derailments, dragging of timber and equipment vibration from heavy traffic cause damage to bonds, a regular inspection and testing schedule must be set up and adhered to.

Such a schedule, properly carried out, will detect all the defects as they occur and thus soon eliminates the bad spots that would otherwise go undetected to heat up and seriously decrease the efficiency of the generator and give rise to the assumption that the system is overloaded.

Poorly bonded negative circuits with their numerous "hot spots," that steam merrily when loads are greatest and rob locomotives and other equipment of much of their full rated power, are the cause for many mysterious armature failures. The 12R or heat losses are proportioned to the drop in voltage of the current which, in a hypothetical instance, we may assume to be as much as 25 per cent. For instance, a generator must produce 620 kilowatts to overcome losses and establish a normal requirement of 540 kilowatts at the circuit's terminus, which means that the loss in power is equal to the ratio between these figures, or 80 kilowatts. Where power sells at the average price of 2 cents per kilowatt hour, the operator stands to lose $1.60 per hour or $3,840.00 for the year of 2,400 hours. The instrument used to supplement usual inspection is a combination of two millivolt-ampere meters jointly on one panel and under a common bezel. The method of operating this unit is quite simple. As illustrated, it has three contact points: A, B and C, which consist of three-cornered 12-inch files with wood handles attached. One file is applied to each of the bond terminals under test, while the third is moved down the length of the rail to calculate the equivalent length of rail. The latter contact is common to both meters, whose dual scales read from one to 0 to 200 in millivolts.

To operate the device the file points corresponding to the 0 to 200 scale are used since the greater range avoids danger of overloading when joints of high resistance are encountered. Contact points A and B are then placed across the top of the rail and the bond terminals and good contact is secured by means of the file edges. The arrow will swing when the current in the rail is sufficient to move it and if the polarity of the rail current coincides with that of the instrument. Obviously, where no current is present, such as during shut-down periods or holidays, an artificial load must be applied between the trolley wire and the rail. This load need not necessarily be large, an ordinary rheostat furnishing 50 to 75 amperes will serve.

Once current flow is established and detected, contact point C is moved along the rail until both instrument arrows read alike. In moving this point C it is essential that the tester look closely for cross bonds or primary connections to negative feeders and contact with pipe-lines, etc., that may be involved in the measurement between point C and the rail end. These can not be included in the measurement since the same current must flow in the rail length as in the bond under test. Then, when both arrows indicate the same values on the scales, the IR or volts drop along the joint is equal to Z feet of the rail. The additional resistance is then equal to Z-AB feet of rail.



Curves showing current loss for different sizes of rails and feeders.

The quantity of resistance in feet-of-rail equivalent is an important factor since when we develop a standard value from a new joint in A-1 condition and compare this with the joint under test, the true resistance is determined. A reasonably accurate rule is that a joint should test equal to 5 feet of rail, although, if more painstakingly accurate data is desired, a graph embodying all the factors, such as added resistance of joint expressed in feet, weight of rail, capacity of band, and length of bonds in inches, is indicated. However, the following will suffice: Using the 5-foot equivalent rule, we are quite safe in condemning any bond failing to match up with that comparison and to order its replacement.

Circumstances vary greatly from mine to mine where the cost of power per kilowatt-hour and allowable volts drops are factors that determine the values to be maintained in negative return circuits.

One bad bond in a mile of track is not a serious handicap to the proper flow of current and efficient motor performance as long as the second rail has bonding in good order, but when numerous bad bonds are present, or there is in fact a complete absence of bonds, wasteful power losses and overheated slow moving machinery is inevitable.

Proper installation, inspection and testing of all bonded joints is not only an economical necessity but also has far-reaching effects in eliminating the cause for numerous "stray" or ground currents that present such momentous hazards in the modern art of igniting mine blasts electrically in favor of the slow, smoky and offtimes uncertain time-fuse methods.

Many states authorize mine inspectors to rate operations on the condition of their bonding circuits.

Where public utilities maintain underground pipe-lines and cables adjacent to badly bonded haulage ways, serious damage results from electrolytic action where stray currents leave such casual conductors. An ampere of current may remove as much as 20 pounds of metal from a line in a year.

It has been proved that a current value of 300 to 400 amperes will usually indicate a loss of approximately 1½ watts per joint. Bond life may be considered equal to the life of the rails when correctly designed and installed; however, the amount of care given the maintenance of the track is the most important factor. Technical Paper No. 62, published by the U. S. Bureau of Standards, provides a reliable method for determining the

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resistance of bonds in terms of adjacent rail at which a bond should be removed and replaced, considering power losses only.

For instance: Where

W—is the weight of rail per yard,
I—is the root mean-square current in the rail for 24 hours,
p—is the cost of power per kilowatt-hour in dollars,
P—is the installation cost of the bond,
N—is the bond life in years,
L—is the reduction of bond resistance effected by the installation of the bond, expressed in feet of adjacent rail, and
R—is the rate of interest paid on the investment.

The rail resistance being approximately 0.001 W ohms per foot the net annual saving in kilowatt-hours or their equivalent in dollars traceable to bond installations will work out as indicated here:

$$12 \times \frac{0.001L}{W} \times \frac{P}{1000} \times 24 \times 365 := \frac{0.00876I^2Lp}{W}$$

Since a chain is no stronger than its weakest link, it is highly imperative that adequate cross bonding be installed to improve the situation by properly utilizing both available rails and including all the conducting elements possible should a bond inadvertently be cut by derailment, etc. Cross bonding to large air, water, steam and negative return wires at regular intervals is also recommended where these parallel the haulageway. However, in no instance should a pipe-line be used or considered as the principal return circuit, although it does make a good conductor because of its tight joints and good cross section. Where track-circuit signal systems are used the cross bonds of necessity must be omitted from the section.

Some appreciable savings are possible by locating the mine substation underground as near the load center as conditions allow or the life of the mineral deposits warrants. Where these stations are planned with adequate provision having been made for large and ample conductors, no difficulty is experienced. It is not the losses suffered through inadequate copper sizes and poor bonding, however, that are the most serious, but rather the loss of production entailed by reason of the inefficient operation of the electrical equipment.

For instance, a mine substation that is operating under handicaps of poor location, undersize wire and high-resistance return circuits may be delivering an actual output of only 200 kilo-watts, although the name-plate rating and the several meters indicate an output of approximately 300 kilo-watts. This can be recognized as the kilowatt-hour loss, which remains fairly constant during the time the abnormal conditions are allowed to exist. The accompanying graph, developed by engineers of the General Electric Company, greatly simplifies the explanation of this problem.

For example, the load center is located approximately 4,000 feet from a motor-generator set that is capable of producing an output of 1,000 amperes at 300 volts, although actually the voltage averages nearer 275 rather than the assumed 300. In this installation 6/0 trolley wire is the size of the positive conductor, while the negative return is over the two 40-pound rails. By referring to the graph we locate the initial point of 1,000 amperes and note where it intersects the resistance curve of the 6/0 trolley wire. On the scale at the left the loss can be read as 32 kilo-watts per 1,000-foot distance. Then following the same 1,000-ampere line on up the curve of the resistance for the 40-pound rails, the equivalent loss as noted on the vertical line at the left will be 13½ kilo-watts for each 1,000 feet of track. Summing the kilo-watt losses in the wire and in the track we have 45½ kilo-watts for each 1,000 feet, or 136½ kilo-watts as the total loss for the entire wire-and-rail circuit from substation to the load. This loss is 45 per cent. of the substation capacity of 300 kilo-watts and remains the same even though the voltage may be stepped up to seemingly compensate for the loss.

There are three primary classes of bond failures: (a) breakage at the rail joint; (b) disentegration of the bonds through chemical reaction by acid mine waters, etc.; (c) impairment of the bonds. Some breakage is directly traceable to faulty manufacture wherein excessive pressure and heat may cause annealing and subsequent weakening of the conductor at that point when flexing occurs. The hammering of heavy traffic soon loosens the point of contact between the lug and the cable and produces metal fatigue and eventual failure. Such a failure is most pronounced where improper bonds are used or where poorly constructed track allows an excessive movement of the rail ends. These failures usually are not readily detected by sight and therefore can only be discovered by electrical tests. Especially is this true in concealed bonds that are misapplied and subjected to severe squeezing and grating action at each passing of the train. Probably the most serious trouble maker is oxidization at the points of contact; caused, in most instances, by moisture and, quite frequently, by corrosive fumes and mine water. Often corrosive fluxes are used in the brazing or soldering operation at the time of the assembly and soft-soldered connections are vulnerable points of entry for moisture.

Compressed or expanded bonds may be short lived due to improper application and often become loosened through movement of the rail ends. This is especially true where they are too rigid or tight to allow unrestricted motion.

Since the conductivity between rail and rail is quite unreliable at best, we can neglect the value presented by the joint plates and consider only the values of the properly installed bond. The arbitrary resistance value of the welded brazed or soldered bond is approximately equal to 1 inch of bond added between the terminals. Tests will show that such a value is closely equal to the resistance value of such length of bond.

The resistance of a section of track is equal to one-half the resistance of the sum of that of all the joints in one of the rails plus one-half the resistance of the rail between the joints contained in one of the rails of that section. The method of calculating it is as follows: Substract the length of one joint (the distance between the terminals of one bound in place) from one rail length (average 30 to 60 feet), using the ratio of the resistance of steel as compared to that of copper as being 1 for ordinary rails. To this we add the resistance of one bonded joint. The resistance of a given section of track will be equal to one-half of this sum multiplied by the quotient obtained by dividing the length of the given section by the length of one rail.

To the resistance of the compressed-type terminal bond, as well as those fitted with pin terminals equal to the length from center to center of terminals measured along the shank, must be added twice the contact resistance of the terminal. Tests made by Messrs. Hall, Smith and Starbird have proved that the contact resistance between soft steel and pure copper at 20,000 to 30,000

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SUBJECT: User Standardized on SLY

DATE: December 27th

YEAR: 1943

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Sly-O-Gram No. 340

To All District Engineers:-

DUST FILTER

You don't need anything to bolster your own confidence in the comparative quality of Sly Dust Filters, but the following may be useful to a customer who shows an inclination to waver between Sly and some other make.

A certain Company which operates numerous plants which create large amounts of very fine dust had accumulated a considerable number of Dust Collectors of many different makes by the end of 1938; among them were 14 installations of SLY Dust Filters totalling 202 feet of actual length.

At that time they called in their operating and their maintenance people and asked them to cast their votes for the make of collector which they liked best from an operating and maintenance viewpoint. The vote was unanimous for Sly. Since that time they have bought only Sly filters and are obsoleting all other makes as rapidly as they can.

Since that time, they have bought 28 installations, totalling 599 feet of actual filter length, making a total of 42 installations of 801 feet, capable of cleaning some 900,000 cubic feet of air per minute.

These people have had a lot of experience with all makes, and have made a real study of the problem.

Their appraisal should be good enough for anybody who is in doubt, and who does not have the opportunity or the facilities to make an intelligent choice by actual experience.

F. A. Sly

FAE:S

General Sales Manager.

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ASK FOR BULLETIN 98

THE W. W. SLY MANUFACTURING COMPANY

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p.s.i. has values of ½ to 1 microhm per square inch. This fact proves that a great deal depends on the thoroughness with which the work is accomplished in causing variations in contact resistance from joint to joint.

There is a wide difference of opinion as to the proper size and number of bonds required per joint, which is probably due to the fact that until recently only limited information was available on the subject. It appears that most operators base their practices on arbitrary rules, whereas it is recommended that theoretical considerations should be used. The principal considerations one needs to bear in mind are as follows:

(1) Install bonds of sufficient cross-section and pattern to furnish good mechanical strength.

(2) Check the volume of the average and maximum current-flow values to estimate the proper size of bond.

(3) Insure having bonds of good materials—any old scrap will not do—and good workmanlike application to produce a conductive efficiency of 90 per cent. of the average rail.

(4) The cost of power and the average negative amperage and the constants of the system will determine the need for double bonding for best efficiency. The absence of heat in a bond does not of necessity indicate 100-per cent. efficiency, since the comparatively short section of copper does not readily indicate a temperature rise by reason of being attached to such large sections of cold steel.

The rail resistance can be calculated as follows:

Let R=resistance of track in ohms
L=length of track in feet
l=one rail length in feet
l_1=distance between bonded joints
r=resistance of rail, ohms per foot
R_1=resistance of one bonded joint including bond.

The resistance from the center of one rail to the center of the next rail, neglecting the resistance of the copper bond, consists of the resistance of one rail length, minus the portion spanned by the copper bond, plus the resistance of two bonded joints, or

$$r\ (l - l_1) + R_1$$

The total resistance of one side of the track is the product of the above two quantities, or

$$\frac{L}{l}\left[\ r\ (l - l_1 + R_1\ \right] = rL\left[\frac{l - l_1}{l} + \frac{R_1}{r_1}\right]$$

The total resistance of both sides of the track in parallel is half of this, or

$$R = \frac{rL}{2}\ \frac{(l - l_1)}{l} - \frac{R_1}{r_1}$$

Under conditions of low ground resistively the effective resistance will be lowered considerably by the presence of ground currents.

The above applies, of course, to a direct-current system. On an arc system the effective resistance would be increased by the presence of eddy currents in the rail, and the reactance should be taken into account.

The following are fundamental constants:

No. 1. Resistance of 100-pound steel rail—0.1 ohm per 1,000 feet; .00001 ohm per foot.

No. 2. Resistance of 0-gage copper—.098 ohm per 1,000 feet; .000098 ohm per foot; .00000817 ohm per inch.

No. 3. Resistance of 0000-gage copper—.049 ohm per 1,000 feet; .000049 ohm per foot; .00000408 ohm per inch.

No. 4. Resistance at contact points of two bond terminals (welded or driven)—.000005 ohm.

No. 5. Resistance of 00-gage copper—.078 ohm per 1,000 feet; .000078 ohm per foot; .0000065 ohm per inch.

$R = .00001 \times 100 \div Y = .001 \div Y$.

Where R is the resistance in ohms per foot of rail, and Y is the weight of the rail per yard in pounds. And thus we find that a 60-pound rail has a resistance of .0000167 ohm by dividing .001 by 60.

Nominate Baker for U. S. Chamber Post

The Buffalo Chamber of Commerce has nominated Melvin H. Baker, president of the National Gypsum Company and past president of the Chamber of Commerce, for director of the U. S. Chamber of Commerce, representing New York, Delaware, New Jersey and Pennsylvania. This is believed to be the first time on record that the Chamber has nominated one of its members as a director of the national group.

The Republic of Mexico has spent almost $400,000,000 for highway development since 1925 and is continuing its program for a net-work of modern roads across the country. This year's expenditures for construction and maintenance of Mexican roads will total approximately $133,000,000.

Crushers (from page 64)

provements in Machines for Breaking or Crushing Stone, Rock, and other similar substances." These improvements were the fastening of the chilled crusher head to the shaft, protection of the journal bearings and better lubrication (Figure 9).

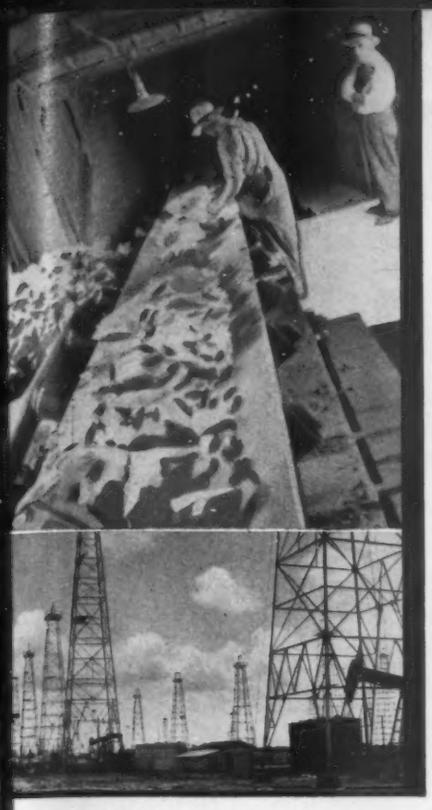
An intense rivalry soon arose between these two types of sledging-machines, the story of which as told by *The Engineering and Mining Journal* was as follows:

February 10, 1883.—"We are informed that Mr. Marsden, of the Farrell Ferro-Dynamic Foundry & Machine Company, of Ansonia, Connecticut, has challenged the Gates Iron Works, of Chicago, which manufactures the Gates crusher. Mr. P. W. Gates has accepted the challenge for a trial to take place within 60 days, in the neighborhood of New York, for the purpose of testing which of the two rival machines is superior to the other."

June 23, 1883.—"The Crusher Contest.—On the 30th of May a public trial was had at Meriden, Connecticut, between the Gates and the Marsden-Blake crushers. The committee having charge of the contest was composed as follows: W. W. Wright, of the Bradley & Hubbard Manufactory, Meriden, Connecticut; P. Callanan, a contractor of South Bethlehem, New York; J. S. Lane, roadmaster of the Hartford division of the New York, New Haven & Hartford Railroad; Simon Ingersoll, president of the Ingersoll Manufacturing Company, Stamford, Connecticut; Isaac Skidgell, official boiler inspector of Meriden. After the contest, the committee met and signed the following report, dated Meriden, Connecticut, May 30th, 1883:

"The committee met at the quarry of the Messrs. Carpenter Brothers on the above date to investigate the merits of a 9- by 14-inch Gates ore crusher, and a Blake crusher with Marsden's improvements, 9- by 15-inch. The Gates crusher was first run with the following results: Amount of stone crushed, 9 yards; time used in crushing, 20½ minutes. The Blake crusher was then run with the following results: Amount of stone crushed, 9 yards; time used in crushing 64½ minutes. The crushers received and discharged the same sized stone, and the same kind of stone. The machines were run from the same shaft."

Both types of crushers are sold and used for coarse crushing all around the globe and each has certain advantages, as is evidenced by the fact that some concerns make both.



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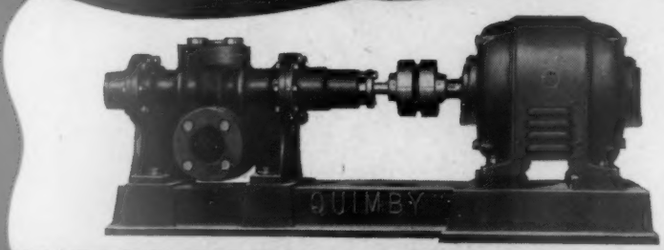

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PERSONAL MENTION

RICHARD B. CAROTHERS, SR., and his son, RICHARD B. CAROTHERS, JR., partners in the Newport Sand Bank Company and the Spinks Clay Company, Newport, Kentucky, were both home on leave in April. Mr. Carothers, Sr. is a lieutenant in the United States Navy while his son is in the Marine Corps.

WILLIAM A. KITTRELL, JR., who has been employed in an executive capacity at the TVA Akins phosphate-rock operations near Columbia, Tennessee, has resigned to become assistant superintendent of the Sloss-Sheffield iron ore mines at Russellville, Alabama.

Lewis Welshans

Lewis Welshans has joined the research department of the Diamond Alkali Company. He will supervise the department's activities involving magnesium oxide and magnesium derivatives, with offices at Painesville, Ohio. For the past ten years he has been with the Standard Lime & Stone Company of Baltimore, where he served successively as control chemist, plant foreman, plant superintendent, development engineer and director of research. A member of the American Chemical Society, Mr. Welshans holds a degree of B.S. in Chemistry from West Virginia University.

A. PRESCOTT LOOMIS has been elected president and treasurer of the W. H. Loomis Talc Corporation, Gouverneur, New York. Mr. Loomis succeeds his uncle, Willis H. Loomis, who passed away in February.

RALPH O. SMITH has been appointed general sales manager of the Vulcan Iron Works, Wilkes-Barre, Pa. Mr. Smith, who was formerly in charge of mining-machinery sales, has been with the company since 1918.

C. P. KEEGEL, formerly general mine foreman with the Northern Peru Mining & Smelting Co., Trujillo, Peru, has become research engineer for Basic Magnesium, Henderson, Nevada.

WILLIAM D. TURNBULL, who has been vice president and sales manager of the Pomona Pump Company of California, has been appointed manager of the Westinghouse Electric and Manufacturing Company's Agency and Specialties Department. Mr. Turnbull's appointment marks his return to Westinghouse after an absence of four years.

J. D. Spalding

JOHN D. SPALDING has been named works manager of the Superior Engine Division plant of the National Supply Company at Springfield, Ohio.

Educated at Carnegie Institute of Technology and Duquesne University, Mr. Spalding joined the National organization as plant engineer at Carnegie, Pennsylvania, in 1923. In 1931 he was transferred to the Toledo plant as assistant district engineer and then on to the Torrance, California, plant as patent engineer. In the 13 years of service at Torrance Mr. Spalding served as assistant to the vice-president from 1935 to 1938 and as works manager from 1938 to his present appointment at the Springfield plant.

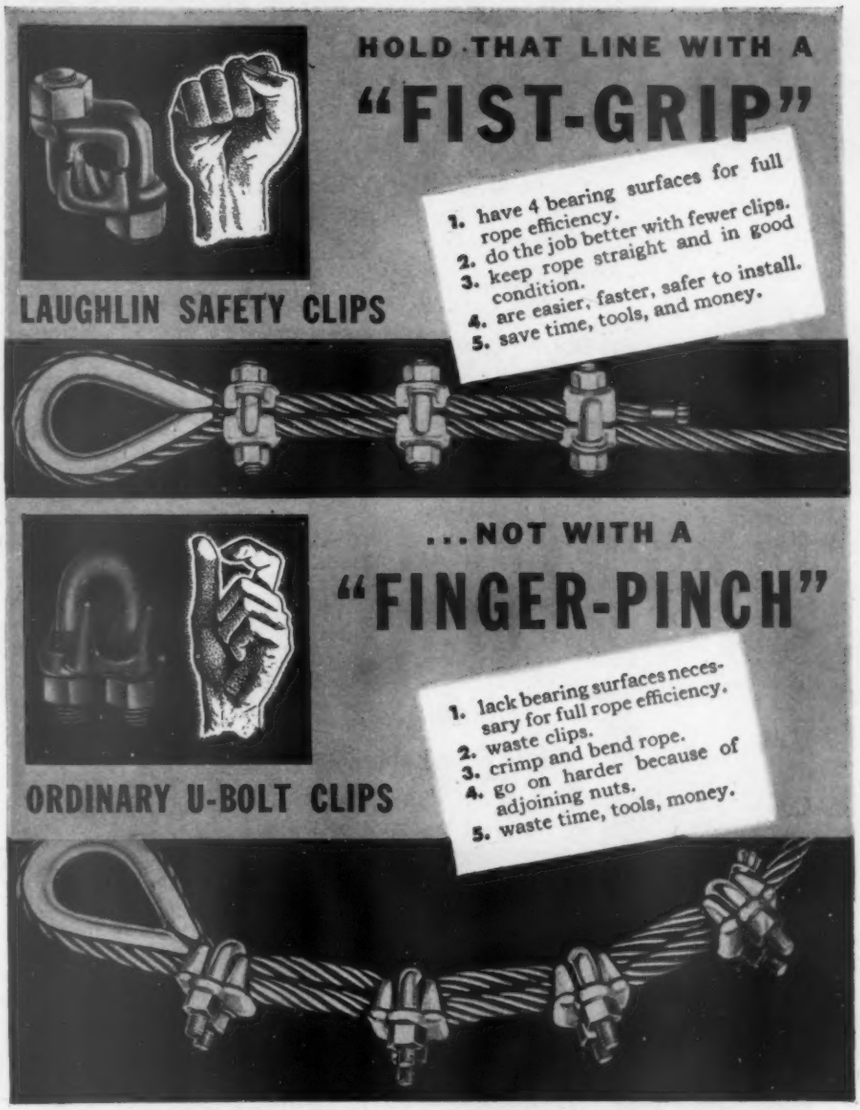
D. S. MCAFEE, vice-president and a director of the Dorr Company, has terminated his association with the company. Mr. McAfee has for several years specialized in equipment and methods for the process industries.

R. C. "DICK" CHAMBERS, formerly of Joseph Ryerson & Sons, Chicago, is the new purchasing representative in Cleveland for the Willamette Hyster Company, Portland, Oregon, and Peoria, Illinois. Offices have been opened in the Willamson building on Euclid Avenue.

Mr. Chambers is well known in the steel industry and as a former football notable at the University of Iowa.

OBITUARY

WILLIAM H. KOCH, 56, for the past 22 years a stationary engineer with the Standard Sand & Gravel Company, Wheeling, West Virginia, died recently.


HOLD THAT LINE WITH A
"FIST-GRIP"
1. have 4 bearing surfaces for full rope efficiency.
2. do the job better with fewer clips.
3. keep rope straight and in good condition.
4. are easier, faster, safer to install.
5. save time, tools, and money.
LAUGHLIN SAFETY CLIPS
...NOT WITH A
"FINGER-PINCH"
1. lack bearing surfaces necessary for full rope efficiency.
2. waste clips.
3. crimp and bend rope.
4. go on harder because of adjoining nuts.
5. waste time, tools, money.
ORDINARY U-BOLT CLIPS

UNIQUE-DESIGN CLIPS PRESERVE WIRE ROPE

Laughlin "Fist-Grip" Safety Clips work like automobile brakes; the more frictional surface, the less pressure necessary to do the job.

Laughlin Safety Clips have identical saddles and flat sides to hold the rope firmly and securely by friction without crushing it. Identical saddles fit snugly against the "live" and "dead" ends. Four bearing surfaces deliver full rope power with fewer clips.

Compare their design with that of U-bolt clips with their single bearing surfaces. Notice U-shaped bolt must be tightly drawn against "dead" end, forcing the "live" end into saddle. It has little frictional surface but does its work by burying its rounded surface into the rope, kinking or crimping the wires.

Use the clips that are kind to your rope. Why chance accidents or damage to your ropes? Laughlin Safety Clips are fool-proof. Get complete details in descriptive folder.

Distributed through Mill, Mine and Oil Field Supply Houses

FORGING A SHARE IN VICTORY

THE THOMAS LAUGHLIN Company

PORTLAND 6, MAINE

MARSHALL PROSSER, 54, superintendent of the Chazy Marble Lime Company, Chazy, New York, died suddenly of a heart attack a few weeks ago.

WILSON M. CAMP, 69, president and founder of the Camp Concrete Products Company, Columbus, Georgia, passed away in March.

ALBERT E. DEEGAN, special field representative of Atlas Powder Company in the West for twenty years, died in Los Angeles, California, February 18, 1944, after a short illness. Mr. Deegan was widely known in the explosives industry, having worked intimately on the job with literally thousands of construction, tunnel, quarry and coal men. He was considered an authority on the proper application of explosives.

MARTIN LUTHER WHITE, operator of the Hollostone Concrete Block Manufacturing Company of North Hollywood, California, passed away in February at the age of 66.

OTTO DIERKS, 75 years old, for more than twenty years connected with the Ferro Concrete Co. in Cincinnati, O., died at Christ Hospital in that city, February 26, after an illness of two and a half years.

MONROE C. MONDAY, president of the Hermitage Portland Cement Company of Nashville and of the Cumberland Portland Cement Company of Cowan, Tennessee, passed away late in February. Mr. Monday was 76 years old.

SHERMAN HELM, 41, an employe of the Montpelier Stone Company at Montpelier, Indiana, suffocated March 24 beneath six feet of limestone when an emptying chute in a bin in which he was working was opened. The chute was too small to allow his body to go through, and he was dead by the time fellow workers had dug the stone away from him.

WILLIAM H. ASHELFORD, 77, purchasing agent for the Byron Sand & Stone Company of Byron, Illinois, died suddenly from a heart attack. Mr. Ashelford is survived by his wife and nine children.

FRED SPRINGER, who for many years was associated with his brother, the late Joseph Springer, in a concrete and stone masonry business at Edina, Missouri, died February 20, at Fulton, Missouri. He was 79 years old.

BRAYTON R. BABCOCK, 74, president of the Callanan Road Improvement Company, crushed-stone producer, died recently after a brief illness at Albany, New York.

LOUIS M. BEATTIE, one of the founders of the Valley Sand & Gravel Corporation of New York state, passed away in February at the age of 76.

LEW V. DAVIS, 61, of Marble Hill, Missouri, died in a hospital at Cape Girardeau, Missouri, on March 5. He had resided at Marble Hill 17 years and was superintendent of the Lutesville Sand & Gravel Company.

FREDERICK JOSEPH PECK, 79, for 30 years a prominent building contractor, passed away recently at his home in Dunmore, Pennsylvania. For the past several years he had served as vice-president of the Scranton Slag Company, Inc.

ARTHUR H. QUADE, 39, eastern representative of the Wisconsin Motor Corporation for the past seven years, died recently.

C. E. LESTER, partner in the Montgomery Lime Company, Christiansburg, Virginia, passed away recently.

It's an engineering fact . . .

This 9" MULTICLONE TUBE has 8 times the dust separating power of a 6 ft. cyclone chamber!

IN RECOVERING dusts, fly ash and other suspended particles from gases, it is a basic engineering law that the separating efficiency of a cyclonic collector tube *in*creases as the tube diameter *de*creases. For example, with the same power expenditure per cubic foot of gas treated, the separating force acting upon a given-sized particle is *8 times greater* in a 9 in. MULTICLONE tube than in a standard 6 ft. cyclone chamber . . . *8 times greater cleansing power to throw out extremely fine as well as coarse particles.* This is why the MULTICLONE is so highly efficient in recovering ALL types of suspensions, even those of low micron size!

The MULTICLONE provides the high recovery efficiencies of *small* diameter tubes because this construction is made practical by the simplified inlet of the *vane* tube design—an exclusive MULTICLONE development. Yet this is just one of *many* advanced features incorporated in the MULTICLONE. Send for Bulletin that describes others!

VG MULTICLONE TUBE
Cross section shows patented vane which guides incoming gases.

36 years of specialization in recovering suspensions—starting with the first commercial application of COTTRELL *Electrical Precipitation—is behind the* MULTICLONE. *Let this experience assist you in the efficient solution of your particular recovery problem!*

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ENGINEERS, DESIGNERS & MANUFACTURERS OF EQUIPMENT FOR COLLECTION OF SUSPENDED MATERIALS FROM GASES & LIQUIDS

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TRAFFIC News Digest

Central Freight Association

Docket 75439 (2).—Slag, crude (the product of iron or steel furnaces), not crushed, ground or pulverized, carloads, minimum weight the marked capacity of the car. Establish on, from Youngstown, Ohio, to Massillon, Ohio, 66 cents per net ton, subject to Ex Parte 148 increase, rate to expire December 31, 1944.

Docket 75440 (2).—Sand, all kinds and gravel, in open-top cars, carloads. Establish on, from Beaver, Ohio, to Powhatan, Ohio, 171 cents per net ton. 115 per cent. thereof in box cars. Rate will not apply on shipments in cars with tarpaulin or other protective covering. In such instances the rates applicable on shipments in box cars are to be assessed. Route: *Via* D. T. & I. R. R.—South Charleston or Washington C. H., Ohio—P. R. R.

Docket 75448 (2)—Firestone, rough quarried, carloads, minimum weight 60,000 pounds, and firestone, sawed, carload, minimum weight 60,000 pounds. Establish on, from McDermott and Roca, Ohio, to Syracuse, New York, 473 cents, per net ton.

Docket 75456 (2) — Sand (except sand, moulding, bonded (naturally or otherwise) and except ground or pulverized sand), or gravel, in open-top equipment without tarpaulin or other protective covering. Carloads. Establish on, to Monessen, Pennsylvania, from Steubenville, Ohio, and New Galilee, Pennsylvania, 121 cents; from West Middlesex, Pennsylvania, 132 cents per net ton, subject to Ex Parte 148 increase. Routes: *Via.* P. R. R., Homestead Transfer, Pa., P. & L. E.; *via* P. R. R., Beaver Falls, Pa., P. & L. E.; *via* P. R. R., to New Castle, Pa., P. & L. E.

Docket 75442 (2)—Limestone, ground or pulverized, unburned, carloads, minimum weight, 60,000 pounds. Establish on, from Mosher, Ste. Genevieve and Marlo, Mo., to Adrian, Mich., 314 cents per net ton. Route: *Via* M. I. Salem, Ill., C. & E. I., Danville, Ill., Wab., Page (South Adrian), Mich., D. T. & I.

Docket 75460 (a)—Magnesite, crude, calcined or dead-burned (having value only for fertilizer), carloads, minimum weight 40,000 pounds. (Actual value not to exceed $50 per ton); Magnesite, calcined, having value only as fertilizer (actual value not to exceed $50 per net ton), carloads, minimum weight 80,000 pounds. Reduce the valuation in connection with the above commodity description, from (a) points named in S. F. T. B. Trf. 392-C and 591-B; (b) St. Louis, Mich., to points in S. F. A. territory, to $35 per ton.

Docket 75495 (2)—Limestone, ground or pulverized, unburned, carloads, minimum weight 60,000 pounds. Establish on, from Gibsonburg, Woodville, Maple Grove, Bettsville and Millersville, Ohio, to Cape Charles, Va., 446 cents; Baltimore, Md., 347 cents; Frederick, Md., 336 cents; Hagerstown, Md., 314 cents; Elkton, Md., 347 cents; Greenwood, Del., 391 cents; Franklin City, Va., 424 cents per net ton.

NAYLOR PIPE GULPS 2,000,000 TONS OF WATER DAILY TO UNCOVER IRON DEPOSITS UNDER CANADIAN LAKE

Here's a dramatic demonstration of light-weight pipe performance on a tough assignment.

In the project of de-watering Steep Rock Lake, more than a mile of large diameter Naylor Lockseam Spiralweld Pipe is literally carrying away the lake at the rate of 7 inches a day. In all, this distinctive light-weight pipe must handle 121 billion gallons of water before the deposits of iron ore can be tapped.

Naylor's exclusive structural advantages enable this light-weight pipe to make light work of gulping 2 million tons of water a day.

That's why Naylor is specified for such services as dredging, hydraulic sluicing, de-watering, ventilating, exhaust and intake and other applications of high and low pressure air and water lines.

Only NAYLOR PIPE Combines All These Advantages

- Always accurate in diameter.
- Concentric ends match correctly.
- Easier to install.
- Holds true cylindrical form.
- Stays tight and leakproof.
- Stronger—safer.
- Handles jobs normally requiring heavier-wall pipe.
- High salvage value.
- Light weight saves steel.
- Cuts maintenance costs.
- Saves money.

Sizes: 4" to 30" in diameter—all types of fittings, connections and fabrications.

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LOCKSEAM SPIRALWELD PIPE

NAYLOR PIPE COMPANY
1257 East 92nd Street
Chicago 19, Illinois

Docket 75506 (2)—Ground limestone. Addition of, to list of commodities in Item 300-A, Sup. 7, C. F. A. L. Trf. 563-D. Exceptions to Rule 10 of Southern Classification, applying on lime, carloads, from points in C. F. A. territory to points in S. F. A. territory.

Docket 75582 (2)—Stone, crushed, slag or gravel, coated with oil, tar asphaltum (see Note A), in open-top cars, carloads. Establish on, from Ashland, Ky., to C. & O. Ry. stations in West Virginia and Kentucky, Buckland Single Line Scale plus 10 cents, increased 10 per cent. Rates to representative points shown in Exhibit A following. Route: *Via* C. & O. Ry. direct.

Representative Points

Rates in cents per ton of 2,000 pounds

Cabin Creek Jct., W. Va., Logan, W. Va., 132 cents; Charleston, W. Va., Trinity, Ky., 121 cents; Craneco, W. Va., Gauley, W. Va., 143 cents; Fullerton, Ky., Hurricane, W. Va., 99 cents; Garrison, Ky., St. Albans, W. Va., 110 cents; Huntington, W. Va., Limeville, Ky., 88 cents; Jenkins, Ky., 154 cents; Kenova, W. Va., Riverton, Ky., 77 cents. Note: The oil, tar or asphaltum not to exceed 10 per cent by weight of the commodity shipped, the shipper to so certify on shipping order and bill of lading.

Docket 75593 (1)—Lime, common, hydrated, quick or slaked or fibered, carloads, minimum weight 80,000 pounds. Establish on, from Genoa, O., to Luckey, Ohio, 7 cents, to expire with Dec. 31, 1944, unless sooner cancelled, changed or extended, *via* N. Y. C. (W) direct.

Docket 75603 (2)—Limestone, ground or pulverized, carloads, minimum weight, 60,000 pounds. Establish on, from East Brady, Pa., to points in Pa., proposed rates as shown in the following:

Lawsonham, 66 cents; Parkers Landing, 72 cents; Kittanning, 83 cents; St. George, 88 cents; Kennerdell, 94 cents; Brandon, 110 cents; Vandergrift, 121 cents; Meredith, McClintock, 127 cents; Aspinwall, Brilliant, 132 cents; DuBois, Pittsburgh, .138 cents; Munhall, East Pittsburgh, Jamison, Haysville, Carnegie, 143 cents; Homer City, Greensburg, Cereal, Morganza, 149 cents; Rolfe, Seward, Donohoe, Horminie, Ruffsdale, Arden, 154 cents; Youngsville, Emporium, Forbes Road, End Brinker Run Br., Old Meadow Wks. (American Sheet & Tin Plate Co.), End Ellsworth Br., Washington, Atlasburg, Union City, Corry, 165 cents; Erie, Corydon, Fairchance, Millsboro, Low Phos, Old Home Works, 176 cents; End Bessemer Branch, End Whyel Br., Mt. Pleasant, 165 cents.

Illinois Freight Association

Docket IRC 511-139—Limestone, fertilizer (applies only on agricultural, limestone screenings or dust, ground sufficiently fine to be used as land fertilizer); also stone, broken, chip, crushed, rip rap, rubble in open-top cars, minimum weight 90 per cent. of marked capacity of the car, except when car is loaded to full cubical or visible capacity actual weight will apply, but not less than 40,000 pounds, from Buncombe, Ill., to C. & E. I. R. R. stations in Illinois and to points on connecting lines in Illinois:

AGRICULTURAL LIMESTONE

To (Representative Points):	Present	Proposed
Broadlands, Ill.	180c	121c
Villa Grove, Ill.	124c	116c
Cadwell, Ill.	124c	110c
Kirksville, Ill.	111c	110c
Fairland, Ill.	166c	116c
Kinmundy, Ill.	88c	77c
Tamms, Ill.	69c	66c
CRUSHED STONE		
Salem, Ill.	97c	94c
West Vienna, Ill.	97c	69c
Joppa, Ill.	97c	77c
Thebes, Ill.	111c	77c

Docket ORMV 221-1—Lime, common, hydrated, quick or slacked, carloads, from Chicago to Panama City, Fla. Present: 813 cents per net ton, minimum weight 30,000 pounds; 642 cents per net ton, minimum weight 50,000 pounds. Proposed: 671 cents per net ton, minimum weight 30,000 pounds; 537 cents per net ton, minimum weight 50,000 pounds.

Docket ORMV 511-18—Sand, moulding, carloads, from Lexington, Tenn., to Edwardsville, Ill. Present: $2.92 net ton. Proposed: $2.42 net ton.

Southern Freight Association

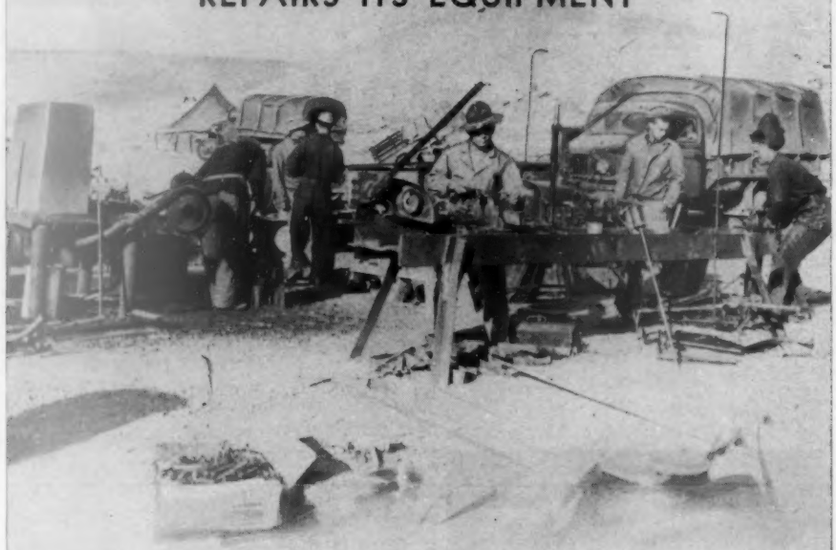
Docket 31196 (shipper; suggested by carrier)—Stone (including dolomite), crushed or broken, carloads. Establish 110 cents net ton from Ragland, Ala., to Holt, Ala. Expires one year from date effective.

Docket 31143-1 (carrier)—Chrome or manganese ore, carloads. Establish from Panama City, Fla., (import) to Emco, Ala., 222 cents and to Rockwood, Tenn., 237 cents per gross ton (not applicable from shipside).

Docket 31218 (shipper; suggested by carrier)—Clay, fire, crude or ground, carloads, minimum weight 60,000 pounds. Establish 420 cents net ton from Clayburn, Hickory, Mayfield, Pryors, Viola and Wingo, Ky., to Olive Hill, Ky.

IT'S NOT SO EASY—

BUT EVEN IN THE DESERT, WITH THE HELP OF HERCULES CARGO BODIES, THE ARMY REPAIRS ITS EQUIPMENT



HOW MUCH EASIER IT IS FOR YOU TO KEEP YOUR EQUIPMENT IN REPAIR!

Don't neglect your Hercules Hydraulic Hoists and Bodies, or your Hercules Split-Shaft Power Take-offs.

Quick service on all Hercules parts is always maintained, and there's a Hercules Distributor with a well equipped Service Department near you.

Hercules Steel Products Co.

GALION, OHIO

Southwestern Freight Bureau

Docket 33324 (1)—Clay, Missouri, to Menasha and Wisconsin Rapids, Wis. To establish rate of 18 cents per 100 pounds, subject to Tariff X-148 (suspended), on clay (other than diaspore), crude calcined, ground or unground, minimum weight 60,000 pounds, except when for carrier's convenience a car of less capacity is furnished, in which event the marked capacity of car will be the minimum weight, from Owensville, Rolla and St. James, Mo., to Menasha and Wisconsin Rapids, Wis.

Docket 33335 (1)—Silica sand, Klondike, Mo., to Dallas, Tex. To establish a rate of $3.07 per ton of 2,000 pounds on silica sand, carloads, from Klondike, Mo., to Dallas, Tex., subject to Tariff X-148 (suspended).

Docket 33348 (1)—Limestone, crushed or ground, Illinois, to the Southwest. To amend Item 1565 of SWL tariff 162-S, by adding Alton R. R. stations Godfrey, Ill. (Index 645) to Nameoki, Ill. (Index 700), and Roodhouse, Ill. (Index 840) to East Louisiana, Ill. (Index 920), to the list of origin points shown therein which will make Basis 31, Item 1530 apply.

Texas-Louisiana Freight Bureau Docket

Docket 7561—Shipper's proposal to establish on lime (calcium), viz.: Common lime, including magnesium lime, hydrated, quick or slaked, carloads, minimum weight 50,000 pounds, for export to Mexico, the rates in the "proposed" columns shown below:

	Present	§Prop.
From Brownsville to:		
Houston	*26c	18c
Dittlinger, McNeil, Round Rock	†26c	18c
Lime City	†56c	18c
From Laredo to:		
Houston, Dittlinger, McNeil, Round Rock	*26c	18c
Lime City	‡47c	18c
From Eagle Pass to:		
Houston	*26c	18c
Dittlinger	‡37c	18c
McNeil	‡42c	18c
Round Rock	‡43c	18c
Lime City	‡49c	18c
From El Paso to:		
Houston	*32c	27c
Dittlinger and Lime City	‡71c	27c
McNeil and Round Rock	‡72c	27c

* Berwick, La., rate under Rule 27, S. W. L. 227-D, *via* S. P. direct or *via* S. P., Beaumont or Houston, M. P. Lines, minimum 50,000 pounds.

† Ft. Towson, Okla., rate under Rule 27, S. W. L. 227-D, *via* St. L. & S. F., Ft. Worth, M. P. Lines, minimum 50,000 pounds.

‡ Class "C" minimum 30,000 pounds, S. W. L. 251-B.

§ Proposed rate subject to minimum 50,000 pounds.

Transcontinental Freight Bureau

Docket 1613 (carrier)—Plaster, stucco and gypsum, carloads, W. B.: Proposal to amend Item 1315, Trf. 4, by adding Cody, Wyo. (Group J) as a point of origin subject to the same rates to North Pacific Coast destinations as published therein from Stucco, Wyoming.

Docket 1514 (Sup. 3) (shipper)—Manganese ore, carloads, E. B.: Request for rate 1,156 cents per ton of 2,240 pounds on $40 per ton valuation and rate 1,199 cents per ton of 2,240 pounds on $55 per ton valuation from Royson, Nev. (Rate Basis 1), to Johnstown, Pa. (Group A), Trf. 3. (no specific minimum weight proposed).

Eagle Screw Washers
Nine Plus Values

(1) More thorough scrubbing.
(2) Controlled, concentrated wash water volume.
(3) High continuous capacity.
(4) Longer screw life.
(5) Wear-proof bearings.
(6) No dead zones in tank.
(7) Starts after shutdown without unloading.
(8) Provides closed circuit without elevators
(9) Low power requirement.

In considering the nine cost-cutting, production-increasing plus values of Eagle Screw Washers, remember that they apply equally to Eagle Log Washers and Sand Dewaterers. These Eagle equipments insure the production of premium washed sand and gravel to conform to the most rigid specifications of today and the still higher requirements of tomorrow.

Good concrete, good roads, good airports, good foundations demand properly washed and classified sand and gravel! Eagle equipments surpass all demands.

More than 70 years of specialized designing and building of sand and gravel machinery are apparent in all modern Eagle equipment.

Use our test and engineering facilities for determining equipment necessary for your individual problem. Our engineers will recommend the proper equipments for your use.

●

EAGLE IRON WORKS
133 Holcomb Ave., Des Moines, Ia.

. . . Production-increasing, cost-cutting ideas for you will be found in Catalog 44.

Send for your copy today!

EAGLE ***Specialized Sand and Gravel Equipment***
"SWINTEK" DREDGE LADDERS — SCREW WASHERS
LOG WASHERS — DEHYDRATORS — SAND TANKS
CLASSIFIERS — REVOLVING SCREENS
EAGLE IRON WORKS
DES MOINES, IOWA
"SERVING INDUSTRY FOR OVER SEVENTY YEARS"

Trunk Line Association

Docket 42115 (shippers)—Rock, ganister, not ground, carloads, minimum weight 90 per cent. of marked capacity of car, etc., from Narvon, Pa., to Sparrows Point, Md., $1.70 per net ton, in lieu of present 6th class rate of 18 cents per 100 pounds. Reason: Comparable with rates from and to other points.

Docket 42119 (shippers)—Clay (crude), fire, carloads, minimum weight 60,000 pounds, from Holsopple, Pa., to Large, Pa., $1.60 per net ton, in lieu of present rate of $2.00. Reason: Comparable with rates from and to other points.

Docket 42136 (shippers)—Limestone, crude, fluxing, foundry and furnace, carloads, minimum weight 90 per cent. of marked capacity of car, etc., to Muncy, Pa., from Howard, Bellefonte, Pleasant Gap, Pa., $1.65 per gross ton, and from Martinsburg and Millville, W. Va., group $1.85. Reason: Comparable with rates applying from and to other points.

Docket 42137 (shippers)—Crude dolomite, carloads, minimum weight 90 per cent. of marked capacity of car, etc., from Millville, W. Va., to Schenectady, N. Y., $2.97 per net ton, in lieu of present 6th class rate of 30 cents per 100 pounds. Reason: Comparable with rates applying to other points in the immediate vicinity.

Docket 4657 (shippers)—Limestone, broken, crushed, ground or pulverized, to Sanford, Me., from Paterson, N. J., $2.92; Chester Valley Group 1, $3.91; Lebanon Group 2, $3.91; Bellefonte Group 3, $4.24; Billmyer, Group 4, $4.02; Tyrone, Group 5, $4.35; York, Group 6, $4.13; Texas, Group 7, $4.35; Ashcom, Group 8, $4.57, and Naginey, Group 10, $4.24 per net ton. Reason: Comparable with rates applying from and to other points.

Docket 42162 (increase-carriers)—To amend Agent Curlett's Tariff 23-M, ICC A-758, by providing for rate of 28 cents per 100 pounds, on cement under Item 4683, from York, Pa., to P. R. R. Stations Brazil, Ind., to Marshall, Ill., in lieu of present rate of 26 cents. Reason: To correct tariff error and place rate on proper basis.

HERE'S A Conversion YOU CAN MAKE Now

To Boost Production *Today*
To Cut "*Changeover*" Costs *Tomorrow*

Boost production today with a new Climax engine drive, and get more work out of old but serviceable machinery.

For stationary work you can make substantial operating economies through the higher efficiencies, valuable heat recoveries and negligible maintenance costs obtained.

For portable service a new Climax engine brings lighter weight, easier handling and greater operating flexibility.

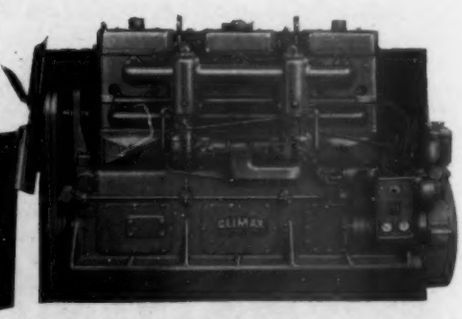
You can "changeover" economically with a Climax engine and put your machinery in top shape for postwar work.

If you are planning new equipment, the "tailored" advantages of these engines are a solution to many machine design problems.

For information, write Climax Engineering Co., 1809 South Fourth Street, Clinton, Iowa.

Climax Engines are 4, 6, 8 and 12 cylinder gas engines with ratings from 8 to 495 hp. The engines operate on natural gas, butane, gasoline or other fuels.

Climax Generating Sets consist of a Climax engine directly connected to an AC or DC generator, in over 100 sizes from 300 watt to 312 KVA.



The Climax R6I valve-in-head Blue Streak engine above develops 180 hp. at 1200 r.p.m.

"For High Achievement in the Production of War Material"

Climax Engineering Company
GENERAL OFFICES & FACTORY:
CLINTON, IOWA
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Legal Decisions

Hearsay Testimony

It is well known that silicosis occurs among workers when the dust to which they are exposed contains free silica. The minimum proportion of silica necessary to produce the disease is not, in the present state of knowledge, determinable. In other words, the medical profession has not been able to determine what minimum proportion of silica may be breathed by man without harm to himself. That breathing certain amounts of silica over an extended period of time is harmful is self-evident from the effects which produce the disease known as silicosis.

Therefore, in the absence of legislative or medical standards, in order to give effect to the State Compensation Law the Industrial Commission must determine what are harmful amounts of silicon dioxide dust from the facts of each individual case. Moreover, hearsay testimony will be accepted by the courts when proving disability from this disease, although such testimony is not generally accepted in other classes of litigation.

For example, in Uta-Carbon Coal Company *v.* Industrial Commission, 140 Pac. (2d) 649, it was shown that an employe had worked in dust laden air since 1912. He quit work in 1942 because he was ill. He was coughing, his chest pained him and he was short of breath. This was the first time he noticed a pain in his chest and was coughing, although in August or September, 1941, he had noticed a shortness of breath upon exertion. Dr. Gorishek, the company doctor, whom he consulted, testified that a physical examination of claimant revealed an occasional rale on the right side of the chest, that he had lost weight, was coughing and raising a considerable amount of purulent sputum, he had a cyanosis of his lips and fingernails, moderate exercise revealed shortness of breath, and an X-ray examination by Dr. Kerby of Salt Lake City, "showed positive findings of a diffused fibrosis throughout the

lungs and a scattered healed tuberculo-foci in each upper lobe cavity in the right part" and his diagnosis was the applicant was suffering from tuberculo silicosis.

In view of this testimony the Industrial Commission awarded the employe compensation. The employer appealed to the higher court on the contention that the commission did not have competent evidence before it from which it could find that the employe was suffering from silicosis because Dr. Gorishek's testimony was based on a diagnosis by Dr. Kerby, the X-ray specialist, and therefore his testimony as to what Obradovich is suffering from is hearsay and inadmissible. Notwithstanding this contention the higher court approved the commission's decision and award, and said:

"Evidence of a writing made as a record, report, or memorandum of facts and conclusions concerning an act, event, or condition, * * * is admissible as tending to prove the truth of each matter stated therein in compliance with statutory requirements. . . . Among the signs and symptoms of silicosis outlined in Public Health Bulletin No. 270, appear the following: Shortness of breath, particularly upon exertion, cough, chest pain, and rales. Dr. Gorishek testified Obradovich had the symptoms described above. It is our opinion that there was ample evidence from which the commission could find, as it did, that applicant was suffering from silicosis with superimposed tuberculosis. . . . In the instant case there was sufficient evidence that applicant (employe) was suffering from silicosis."

Also, see Argonaut Mining Company *v.* Industrial Commission, 21 Cal. App. (2d) 942. This court held that silicosis is prevalent among employes in mines, potteries, stone and slate factories where the air is permeated with minute particles of stone, quartz, slate, or metal dust which is inhaled to the detriment of the tissues, glands, and lungs.

This court also stated that some men appear to be immune to the disease, but a large proportion of those who are engaged in such pursuits are susceptible to silicosis. In other words, the incurring and development of this disease depends somewhat upoon the constitution of the employe and upon the conditions under which he works. The course of the disease may be rapid or gradual, sometimes extending over a period of several years before the victim is finally disabled for the performance of manual labor.

Another important higher court

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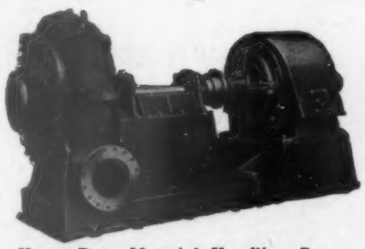
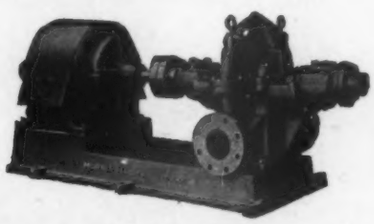


Heavy-Duty Material Handling Pump



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CENTRIFUGAL PUMPS

case is Krzewinski *v.* Robert Company, 304 Mich. 63. Here the question to be determined was when silicosis was contracted for the purposes of the state's occupational disease law.

This court held that since silicosis is a latent, chronic process, it becomes important to discover what the state legislature means when it specifies a time limit in which employes must contract the disease. The court held that a law of this nature must be construed to mean that an employe "contracts" silicosis at the time the first symptoms appear. This court said further that if this rule were not adopted the statute requiring that contracting of the disease "must come within one year of the disablement" would in an effective or practical sense take away all the benefit of the law making the disease compensable.

Labor Standards Act

The Fair Labor Standards Act is a comprehensive law designed by United States Congress to prevent the shipment in interstate commerce of commodities produced in the United States by lowly paid employes. It prescribes a 44-hour week and minimum wage payments. However, the act is applicable exclusively to employes engaged in the production or handling of goods for interstate commerce.

For illustration, in Stoike *v.* New York, 48 N. E. (2d) 482, it was shown that a night porter or watchman was employed to clean the building. His employer was engaged in interstate commerce business. The employe sued to recover extra compensation, penalties, etc., under the Fair Labor Standards Act. In holding the employe not entitled to a recovery, the higher court said:

"The plaintiff's work of cleaning and dusting the quarters although it may contribute remotely to the comfort and convenience of those whose services are vital to its business, is not a step in the process . . ."

Purchaser Obligated

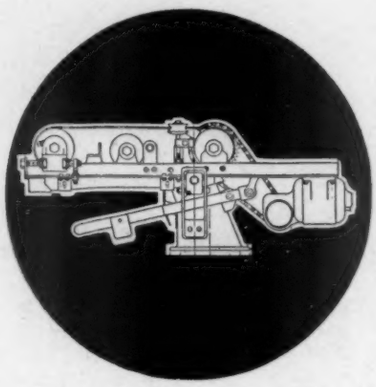
Modern higher courts hold that failure of a seller to deliver merchandise on the exact date promised may entitle the purchaser to rescind the contract. However, if the date of delivery is not positively stated the sale contract is valid if the seller makes delivery "within a reasonable time" after the sales contract is signed or approved.

For example, in Mullen *v.* Hibbert, 33 Atl. (2d) 435, the testimony disclosed that a salesman took an order for merchandise and promised delivery, "if at all possible", the next day. The merchandise did not arrive on Thursday afternoon or Friday morning, but it arrived Friday afternoon. However, the purchaser refused to accept delivery.

The seller filed suit and the lower court held the purchaser bound to accept and pay for the goods. The higher court upheld this verdict and said:

"No definite time was agreed upon for delivery. . . . Where by a contract to sell or a sale the seller is bound to send the goods to the buyer, but no time for sending them is fixed, the seller is bound to send them within a reasonable time."

Still another important point of law, decided by a modern higher court, is that where under a contract the buyer is allowed a specified time in which to discover defects, and binds himself to report immediately thereafter to the seller all defects discovered, the purchaser forfeits his legal rights if he fails to comply with the details of this agreement. Also, see De Witt *v.* Itasca, 10 N. W. (2d) 715, where the testimony proved that a clause



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in a contract required the purchaser to inspect the merchandise at the delivery point. Also, the contract stated that the purchaser "may reject" defective material.

It is interesting to observe that the higher court indicated that under a contract of this nature a purchaser becomes obligated to pay for all merchandise which he accepted and used, irrespective of the fact that the seller incorrectly marks or labels certain of the merchandise.

Questions and Answers

[Mr. Parker will be glad to answer questions regarding legal problems of PIT AND QUARRY readers. Questions should be addressed to Leo T. Parker, Legal Editor, PIT AND QUARRY.—ED.]

Legal Editor: What employees are within the federal wage law? We have a foreman who says he is entitled to wages specified by this law. Are we liable for failure to pay him minimum wages?—M. S. & G. C.

Answer: The Fair Labor Standards Act provides that the specified minimum wages are not applicable to *bona fide* executives. In *Zaetz v. Corporation,* 30 Atl. (2d) 504, it was shown that an employee regularly directed the work of other employees. He offered suggestions as to hiring, firing, and change of status of other employees. He exercised discretionary powers, and was compensated on a salary basis at more than $30 per week. He sued his employer to recover time and one-half for overtime over a period of several months. The higher court refused to hold the employer liable because the employee could not prove the exact hours he had worked overtime.

However, this higher court held that a "working" foreman is *not* an executive. Therefore, a working foreman must be paid wages specified by the Fair Labor Standards Act, but he must definitely prove the exact hours he worked over his regular hours otherwise he can not recover a favorable judgment.

* * *

Legal Editor: Assume a watchman handles some sand and gravel shipped in interstate commerce, and is entitled to wages specified by the Fair Labor Standards Act for this time. How are we to know what part of his time is within this law?—A. C.

Answer: Modern higher courts hold that a night watchman who performs services such as handling

Manganese Steel Dredge Pumps In T.V.A. Wartime Projects

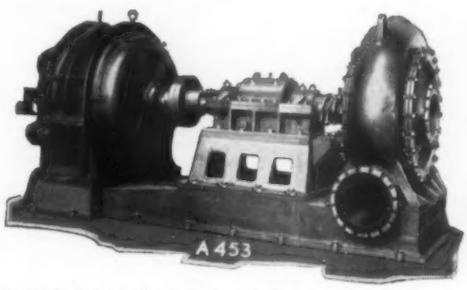
Tennessee Valley Authority's dual war assignment has been to supply additional electric power and to increase aluminum output from its territory.

New dams were rushed to completion to provide deep lakes of impounded water; literally reservoirs of power. For the Apalachia and Ocoee dams, the Birmingham Slag Company of Birmingham, Ala., was the principal supplier of concrete aggregates, a large proportion of which was sand and gravel from the bed of the Tennessee River.

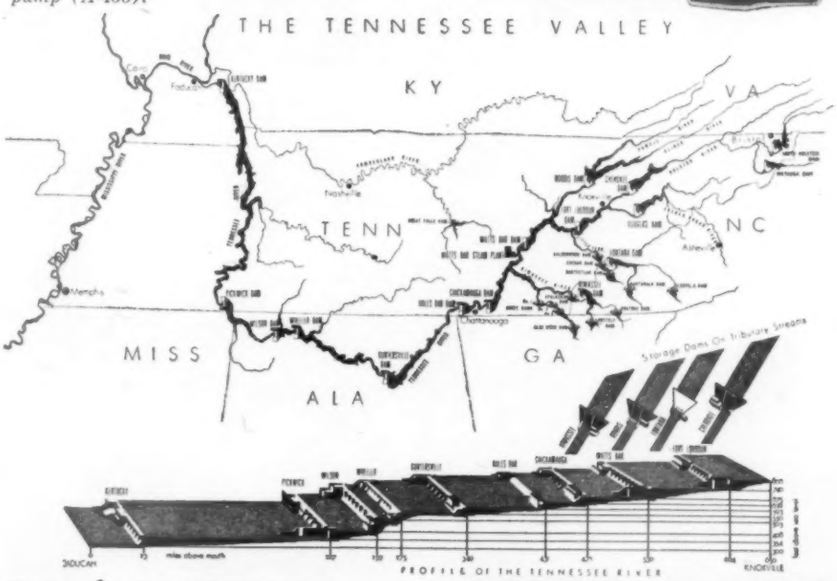
They had two hydraulic dredges on this project. One unit was primarily assigned to excavation, with the other as a standby machine to assure uninterrupted production when repairs were required. Both dredges are equipped with rotary cutter ladders for 50-ft. digging, and 15-in. Amsco type H Form 44 heavy duty dredge pumps, powered by 400 h.p. 440 r.p.m. electric motors. All materials were pumped direct to barges which were towed to the screening plant docks. An Amsco pump similar to those employed is pictured (A453).

The company has fulfilled every demand for aggregates on continuous 24-hour operations. The large volume of sharp aggregates handled under high velocity and pressure required dependable pump parts of long wearing life. Impact and abrasion resistant manganese steel, in Amsco water-end castings, played an important role in T.V.A.'s great war task.

Ask for bulletin on Amsco Dredge Pumps, Pipe Fittings and Rotary Cutters.



Amsco 15-in. type "H" heavy duty sand and gravel dredge pump (A-453).



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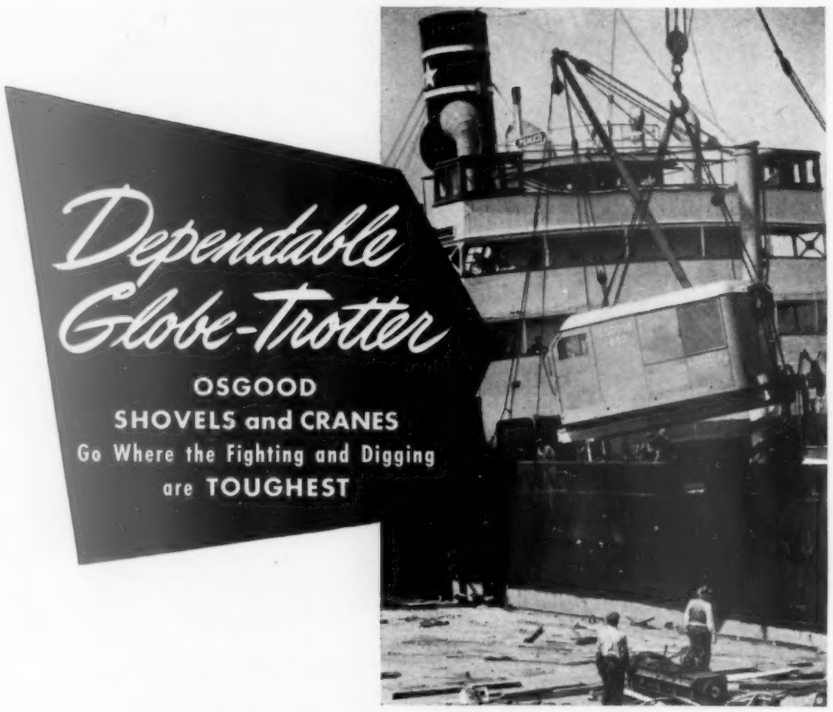
sand and gravel, or other merchandise, processed or produced for shipment in interstate commerce, etc., is entitled to the benefits of the Fair Labor Standards Act for all his time. For example, in *Ashenford v. L. Yukon & Sons Company,* 172 S. W. (2d) 881, an employee filed suit against his employer to recover unpaid minimum wages and overtime, liquidated damages, and attorney's fee. The employee was employed as night watchman, janitor, and loader and unloader, and time keeper.

The employer contended that he was not within jurisdiction of the Fair Labor Standards Act because the watchman was engaged in handling merchandise for sale in both intrastate and interstate commerce and he did not separate the time he watched over goods for interstate and intrastate shipments. However, the higher court held the employee entitled to full recovery, and said:

"We conclude a watchman is not required and could not separate the time he watches over goods for interstate and intrastate shipment."



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Legal Editor: A few months ago a city water pipe froze and burst. It did considerable damage. Also, water froze on a sidewalk and a man slipped and was injured. Is the city liable?—S. C. S.

Answer: In *Independence,* 171 S. W. (2d) 759, the higher court refused to hold a water corporation liable for damages because the franchise of the water company did *not* impose a *duty* to keep accessories, pipes, etc., in repair. Moreover, the fact that a meter box, service line, etc., is *not* located on private property has no bearing on the case if the municipality or water corporation has assumed *no* control over it. This court said:

"Defendant (water corporation) not only did not construct the box but was under no duty to construct it. . . As there is no evidence that defendant constructed the box in question, it can *only* be held liable for plaintiff's injury *if* it was under the duty to properly maintain the box and failed to do so."

Conversely, if a municipality or water company has control over an accessory, or is duty bound to repair it, liability may be assumed. On the other hand, municipalities are liable for injuries to citizens if the city authorities are negligent, because they are impliedly obligated to use "ordinary" care to discover and repair dangerous conditions. But, if they use this degree of care the city is not liable.

For example, in *Pischke v. Borough of Dormont,* 33 Atl. (2d) 480, reported September, 1943, it was disclosed that a sidewalk sloped downward to a water box. A pedestrian stumbled over it and sustained serious injuries. He sued both the city and the water corporation. In holding neither the city nor the water corporation liable the higher court said:

"The evidence discloses that this sidewalk was reasonably safe and that the condition existing in and about the water box did not create a hazard or danger to pedestrians, which was observable on reasonable inspection. There was no evidence that any one else had fallen, or of any complaints made to either the borough or the water company."

* * *

Legal Editor: Recently we were sued by a purchaser who contends that we made verbal promises as to the quality of our products, and he claims that these verbal promises are as effective as the guarantee contained in the written contract. Is this so?—M.S.G.

Answer: Generally speaking, a

written contract can not be varied by verbal agreements. For this reason parties to a written contract should always reduce their oral agreements to writing and attach them to the original contract. Failure to do so usually results in litigation, and the court will decide the issue in view of the obligations expressed in the written contract.

For example, in *Thunder Bay Quarries Company v. Pollard,* 3 N. W. (2d) 316, it was disclosed that a seller, named Pollard, obtained an order from the Works Progress Administration of the federal government for 30,000 tons of crushed stone of an odd size, to be used by the W.P.A. for the pavement of alleys. Pollard negotiated with the Thunder Bay Quarries Company for stone to fill the government contract. Just what the agreement was became one of the main issues of a litigation. It is conceded that the company was to furnish stone at 90 cents per ton, less 5 cents discount if payment was made in 30 days.

Pollard claimed that the time of payment was verbally extended by the officials of the quarry company, who denied this and refused to allow Pollard the 5 per cent discount. Pollard filed suit, but the lower court refused to hold that Pollard was entitled to this discount. The higher court upheld the verdict, and said:

"On the other hand, it is important to know that testimony relating to oral conversation and agreements may be reviewed by the court to determine the intended meaning of the contracting parties where the contents of the written agreement is not clear and ambiguous."

On the other hand, the court will listen to verbal agreements, if it is necessary to do so in order to determine the original intentions of the contracting parties. For example, in *Seitz v. Zukowski,* 215 N. W. 939, it was disclosed that two parties entered into a contract in writing, whereby it was agreed that the Winona Monument Company should perform certain work using marble. Controversy developed when the purchaser refused to pay for the work on the contention that the monument company had substituted chips of stone and concrete behind the slabs instead of using solid marble throughout the construction.

The monument company contended that wording of the contract permitted this changed construction. Therefore, the court took verbal testimony to determine the *intended* meaning of the contracting parties when the written contract was originally made. From this testimony the higher court decided that the company was obligated to use marble exclusively. Therefore, the court held the monument company not entitled to payment, and quoted the law as follows:

"The court properly received evidence of what was said before the contract was signed, *not* for the purpose of contradicting the written contract, but to explain ambiguous terms used in the contract. . . Parol evidence to vary the terms of a written contract is one thing; such evidence to enable the court to say what the parties to a contract intended to express by the language adopted in making it is quite another thing. The former is not permissible. . . The latter is permissible, and is often absolutely essential to show the real nature of the agreement."

* * *

Legal Editor: Under ordinary contracts of sale, is it necessary to know or study details of complicated law? In other words, when we enter into a contract are both we and the buyer obligated by the plain terms of the contract, if, for instance, the purchaser does not

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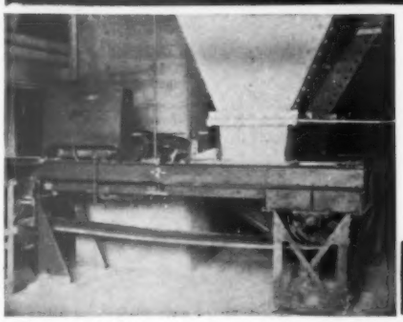

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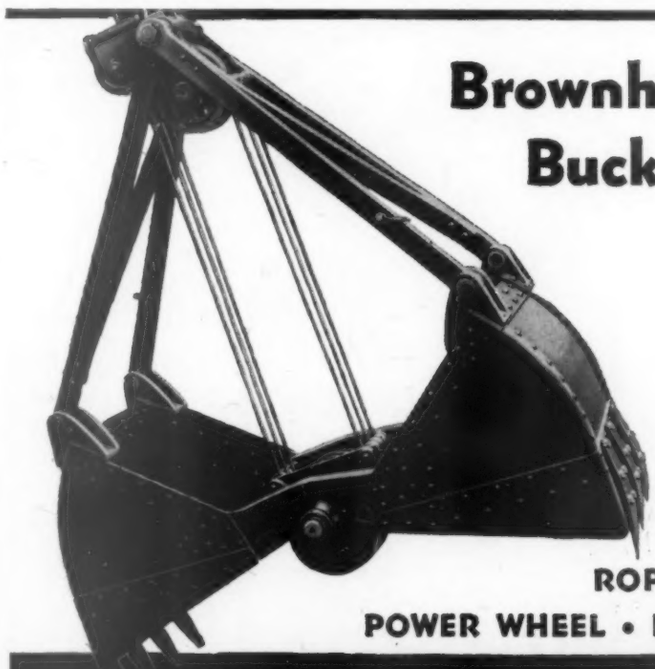

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positively agree to accept and pay for the merchandise?—H. M. McK.

Answer: Very frequently executives, officials and employees of companies are surprised to learn of adverse decisions in suits involving sale contracts which, at first hand, appeared to have little or no chances for company liability. In many of these past contract litigations the real and important reason the company lost the suit is because executives and officials were not aware of the likelihood of legal controversy and did not prepare for litigations.

First, it is important to be able to determine whether or not a contract is valid, because unless a contract is valid neither party is obligated and neither party is liable for failure to fulfill the terms of the agreement. For illustration, every contract must have valid "consideration". In a late case the court held a rock company liable in damages because a company official did not know that a mere promise of one party, and *without a promise* of the other party to do something, does *not* result in a valid contract. In other words, both contracting parties must agree to perform some kind of service, work, or benefit, otherwise the contract is void and ineffective.

In *Scram,* 42 F. Supp. 525, a federal court said:

"Consideration is the thing bargained for and given in exchange for a promise."

In *Schwartz,* 39 N. E. (2d) 548, the court held:

"A valuable consideration consists in the acquisition of some legal right by the promisor, in return for which he makes the promise, or in the giving up of some legal right by the promise, in return for which the promise is made to him, and if the promisee gives up a legal right such forebearance is a 'consideration' even if the exercise of that right would not in fact, have been profitable to him."

Some higher courts have held that "consideration" of a contract can be a mere promise on the part of one party to do something, if the other party also promises or agrees to do something for the benefit, or with respect, to the other contracting party. If only one party promises to do something, or render a service, the contract is void.

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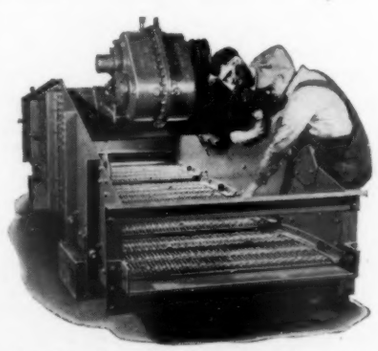
• Screen Deck

A new tensioning principle is employed in the design of the "end-tension deck," now made available by Allis-Chalmers on Low-Head, Aero-Vibe, and Ripl-Flo vibrating screens. The deck can be used for wet and dry screening, washing and dewatering processes.

The desirability of maintaining an even bed depth in screening processes for the sand, gravel, crushed-stone industries led the manufacturer to design a deck which eliminates transverse arching of the screen surface, as with transverse single and double crowned decks. By employing a series of longitudinally-tensioned, transversely-flat screen surfaces,



Tension deck with clamp bars in place.

Illustrated above is a Model 5SF semi-trailer dump unit with special 10-cubic yard body for quarry service, built by the Truck Engineering Corporation, Cleveland. This company makes a wide variety of similar units for all types of material hauling ranging in capacity from 6 to 10 cubic yards when used for sand and gravel.

the end-tension deck inherently maintains even depth of material.

The screen is tensioned by clamp bars at the ends of the screen and by intermediate adjustable bars when more than two screen sections are used.

A distributing plate at the feed end of the screen distributes material uniformly over the entire width of the screen to reduce surface wear.

Sections of the deck may be turned end for end and upside down for longer screen life. Transverse supporting bars on the underside of the deck are covered with molded rubber strips, and act as individual drip strips to assist in more efficient draining of the material in washing and dewatering processes. The feed end of each section can be furnished with a blank surface designed to obtain a pool-washing effect for scrubbing and scouring the material.

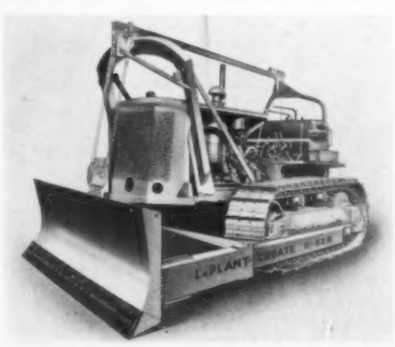
Further information on the "end-tension deck" may be obtained by writing Allis-Chalmers Manufacturing Company, Milwaukee, for Bulletin B-6321.

• Bulldozer

Another post-war earthmoving unit has just been announced by the LaPlant-Choate Manufacturing Company, Inc., Cedar Rapids, Iowa. This is a cable-operated Trailbuilder, designated as model R-82R, and designed for mounting on a Caterpillar D-8 tractor.

The unit retains all the structural features of this company's bulldozer line—welded steel construction, box channel frame, box plate blade, pressed and formed sections. The cutting edge has been reinforced with more bolts compared with earlier models, while the cutting bits at either end of the blade are single plates formed to fit the ends of the blade for greater wear resistance in rock cuts. The front overhead is a new design for increased strength and better appearance.

An outstanding feature of this Trailbuilder is its simple and positive operation. The three-position blade can be positively angled either to right or left, or held in straight bulldozing position. Either end of the blade can be tilted up or down with a variation of 14 inches while in straight bulldozing position as well as when the blade is in either angling position. This is accomplished quickly by pulling two pins. The blade can be raised a maximum of 50 inches, or dropped 72 inches below the ground line. This movement is accomplished by means of a Caterpillar double-drum power control unit. A single cable is used.



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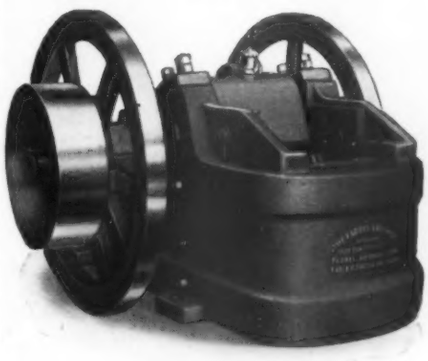

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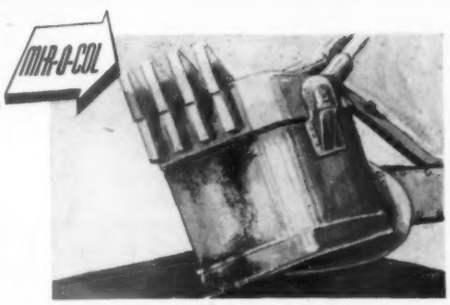

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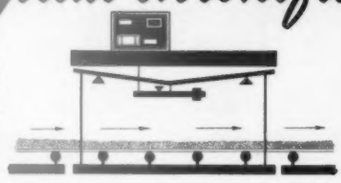
This results in reduced maintenance costs and elimination of expensive service interruptions—thus giving a three-way saving: Less time-loss, less maintenance cost, less parts cost.

MIR-O-COL ALLOY CO.
HARD SURFACING RODS
FERRO-ALLOY CASTINGS
2416 EAST 53rd STREET
LOS ANGELES 11, CALIF.
"There's Nothing Accidental About Quality"

BUILDERS
Toledo Chronoflo



CONVEYOR SCALE

Dependable equipment for *accurately* weighing and/or blending gravel, cement, crushed rock, limestone or sand, *in transit*, on conveyor belts. Write to Builders-Providence, Inc. (Division of Builders Iron Foundry), 9 Codding St., Providence 1, R. I. for Bulletin 322.

Sincerely Yours,
BUILDERS-PROVIDENCE

● Oxygen Recorder

In order to insure efficient combustion conditions in cement kilns, it is becoming a general practice to test the flue gases. One of the most reliable indications of the completeness of combustion is the percentage of oxygen in these gases, and there is an increasing demand for apparatus whereby this percentage may be accurately determined. The Cambridge Oxygen Recorder has been used in the field for a number of years and has proved itself to be an important element in maintaining efficient kiln operation.

The meter panel, shown in Figure 1, consists of the meter, furnace, combined bubbler and aspirator, and power pack. The aspirator draws the gas from the kiln through the filter into the bubbler, which washes the gas and separates it into two streams, maintaining the smaller at a constant flow and passing it through the meter and furnace. The value of this flow is determined by an orifice placed in the front of the furnace. The main gas flow goes directly to waste down the aspirator.

In essentials, the meter consists of two identical fine platinum wires in two cells contained in a metal block. The wires are heated by passing equal electric currents through them, and when both cells contain the same gas, the two wires attain the same temperature. If, however, the oxygen in the gas in one cell is replaced by an equal volume of CO_2, the wire in that cell will become hotter than the other, the difference in temperature being proportional to the increase of CO_2 concentration in the cell.

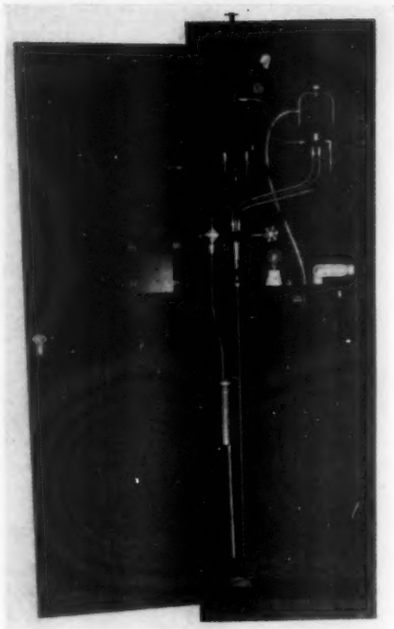


Figure 1.

The galvanometer of the recorder shown in Figure 2, is connected to the two wires in such a way that its deflection is a measure of the difference of their temperatures and, therefore, of the difference in composition between the gases in the two cells. The gas stream is passed first to one cell in the meter, through the furnace, and then to the second cell. The furnace contains a rod of hard carbon heated to combustion temperature so that during its passage through the furnace any oxygen in the gas is converted to CO_2. The change in CO_2 concentration between the two cells and, therefore, the current in the galvanometer, is proportional to the oxygen concentration of the original gas.

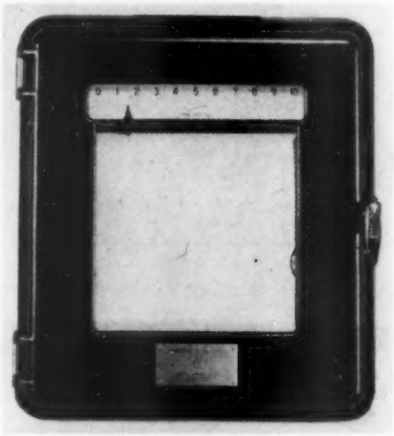


Figure 2.

The main filter, which is connected in the sampling pipe between the intake and the bubbler aspirator, consists of an electrically heated chamber containing a felt disk through which the gases must pass. During its passage through the filter the gas is maintained at a temperature above the condensation point, with the result that the felt disk is kept dry.

Maintenance requirements are mainly limited to the usual recorder routine, in-

SECO *The Right* VIBRATING SCREEN
for Damp, Sticky AG-LIME

patented SECO *Auxiliary Vibrator keeps meshes open*

POSITIVELY CONTROLLED
Gyrating Action

PUTS EVERY INCH OF SCREEN SURFACE TO WORK

● Operators have proved the remarkable ability of Seco Screens to efficiently screen damp, sticky limestone. A Seco Patented Auxiliary Vibrator keeps meshes open and Seco's positively controlled gyrating action guarantees a sharper whip that increases capacity, allows close grading and prevents blinding.

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SCREEN EQUIPMENT CO., INC.
9 Lafayette Avenue BUFFALO, N. Y.

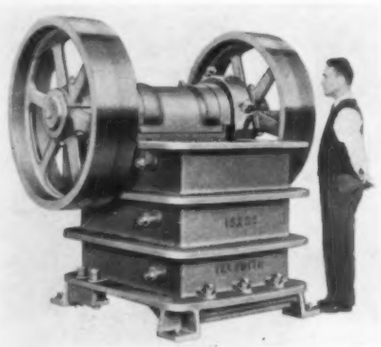
specting the water supply to the aspirator, and daily ramming of the sampling tube. The carbon rods in the furnace will last about two weeks and can be readily replenished.

The recorder can be located any desired distance from the meter panel. The chart width is 10 inches and the speed 1 inch per hour. The standard range of the instrument is 0 to 5 per cent. oxygen. The accuracy of calibration is within 0.1 per cent. oxygen.

• Crusher

The first of an entirely new line of Telsmith roller-bearing jaw crushers, this 18- by 32-inch size has a wide demand. This crusher, as well as another new machine larger than the present 25- by 36-inch unit will complete a line of nine sizes with capacities ranging from 5 to over 300 tons per hour.

These new Telsmith jaw crushers retain many of the well-known features of



Cast-steel jaw crusher.

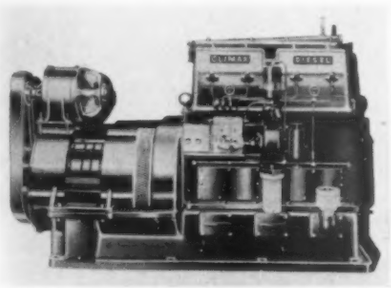
the old Telsmith-Wheeling jaw crushers plus some new, different and very desirable improvements.

With heavy steel castings, such as used in all models of Telsmith crushers, there is no chance for weaving or cracking, with the resulting misalignment of bearings and other parts. With a solid cast steel frame and swinging jaw, properly annealed, there is the least chance of trouble of any kind, the company claims.

• Diesel Engines

The production of two solid injection, compression ignition engines has just been announced by Climax Engineering Company of Clinton, Iowa. These prime movers are additions to the Company's line of Blue Streak gas engines, 8 to 495 h.p., generating sets, 300 watts to 312 Kva., and complete accessory equipment.

Both new engines are 4-cycle, full diesels and intended for use as light plants and primary drives for pumps, compressors, mills, mine equipment and marine service.



The 4-cycle Diesel engine.

TRADE NOTES

The Brill Equipment Company, machinery dealer, is moving its offices and warehouse from 183 Varick Street, where it has been for the past twelve years. The new offices will be located at 225 West 34th Street, New York City and the new warehouse and shop will be located at 2401 Third Avenue, Bronx.

R. G. LeTourneau, Inc., which recently announced plans to establish its own, exclusive distributor organization, has already so named seven leading dealers in as many portions of the United States and Canada.

Included are: Loggers & Contractors Machinery Company, Portland, Oregon; Victor L. Phillips Company, Kansas City; Nicoll - Talcott Corporation, Hartford, Connecticut; Wylie-Stewart Machinery Company, Oklahoma City; General Supply & Equipment Company, Inc., Baltimore; Tri-State Equipment Co., Memphis; and General Supply Company of Canada, Ltd., Ottawa.

On March 30, the San Francisco plant of Link-Belt Company, Pacific Division, was awarded the Army-Navy "E" for excellence in production of vital war material, making it the fifth Link-Belt plant to be thus honored.

Announcement has also been made that the Pacific Division has opened a new office and warehouse at Spokane. Homer A. Garland is in charge.

The Eighmy Equipment Company, distributor of construction, industrial and material - handling equipment announces the removal of its sales office from Rockford, Illinois, to Rochelle, Illinois. A larger building has recently been purchased in Rochelle to house the office as well as the machine shop and rebuilding shop which was acquired a year ago.

The Yale & Towne Manufacturing Company, New York, has purchased the scale business of the Kron Company, Bridgeport, Connecticut. According to the announcement no changes in the line are contemplated, except for such natural developments which grow out of industry's needs.

Trade Literature

The pieces of literature listed below can be obtained direct from the manufacturers named, or requests can be addressed to Pit and Quarry's "Service to Readers" Department.

FACTS THAT HELP. Issue 3, dealing with the duties of an oil in compressor lubrication. 15 pages. The Shell Oil Company, New York City.

VIBRATORY MATERIAL HANDLING EQUIPMENT. 64 *pages.* (*Catalogue* 440). The Syntron Company, Homer City, Pennsylvania.

LABORATORY UNITS FOR PULVERIZING

Consider sensibly your use of Air Compressors

• How many operations do you have where costly, cumbersome compressors could be replaced with low-cost, flexible Smiths? How much time and money will you save with Smiths that are easily moved from one job to another and use only 1 gal. of gasoline an hour. *This thinking deserves your serious consideration.*

Smith Compressors are admirably equipped to give you all the power you need for most compressor work. Made with FORD Motors, standard parts and the famous Smith Compressor Head, they are sources of satisfaction to users everywhere. . . . Low initial cost, operating cost and maintenance. Capacity easily varied for different jobs. Repairs and parts available everywhere. Automatic unloading and idling; self-starter; no couplings, belts, clutches or gears to cause trouble.

May we tell you more about Smith Compressors? Wire, phone or write today!

GORDON Smith & CO. Incorporated

481 College St., Bowling Green, Ky.

ERIE THE COMPLETE LINE BUCKETS

Erie builds *all* types of buckets in various weights and capacities to meet the job and operating conditions. Choose the correct bucket for the job and you get the maximum speed and output. Write for broadside on the complete Erie line of buckets

ERIE STEEL CONSTRUCTION CO · ERIE, PA.
AggreMeters · Buckets · Concrete Plants · Traveling Cranes

PERFORATED METAL SCREENS
FOR SAND, GRAVEL STONE, ETC.

Manufactured exactly to your specifications.

Any size or style screen, in thickness of steel wanted with any size perforation desired.
We can promptly duplicate your present screens at lowest prices.
Prompt Shipment

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Hammer Crushers — Revolving Screens
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All Types and Sizes to Suit the Job
Write for bulletins.
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NEW HOLLAND, PENNSYLVANIA

Ty-Rod — THERE IS A — Ton-Cap

TYLER
Woven Wire Screen
for
EVERY SCREENING PURPOSE!
Write—
THE W. S. TYLER COMPANY, Cleveland

AND SEPARATING. 11 pages. (Bulletin 53). Raymond Pulverizing Division, Combustion Engineering Company, Incorporated, Chicago.

A PRESENTATION OF WELDING AND CUTTING EQUIPMENT. 15 pages. (Form 20). Victor Equipment Company, San Francisco.

OPERATOR'S HANDBOOK. 69 pages. The Euclid Road Machinery Company, Cleveland.

AIR HOISTS AND AIR MOTORS. 15 pages. (Bulletin H, second edition). The Gardner-Denver Company, Quincy, Illinois.

BELT CONVEYOR EQUIPMENT. 159 pages. (Catalogue 60-B). Webster Manufacturing, Incorporated, Tiffin, Ohio.

WELDING PRODUCTS FOR RECLAMATION, HARD SURFACING AND REPAIRING OF FERROUS EQUIPMENT PARTS. 11 pages. (Bulletin 941-W). The American Manganese Steel Division of the American Brake Shoe & Foundry Company, Chicago Heights, Illinois.

TYPE "B" JUNIOR HERCULES MILL, A PULVERIZING MACHINE BUILT EXPRESSLY FOR THE AGRICULTURAL LIMESTONE INDUSTRY. 4 pages. The Bradley Pulverizer Company, Allentown, Pennsylvania.

THE ROBINS LINE. 24 pages. Robins Conveyors, Inc., Passaic, New Jersey.

SAND, GRAVEL, ORE EQUIPMENT. 24 pages. (Bulletin 44). Eagle Iron Works, Des Moines, Iowa.

NOZZLES AND RELATED PRODUCTS. 32 pages. (Catalog 22). Spraying Systems Company, Chicago, Illinois.

WIRE GROMMET V-BELTS. 4 pages. HOW TO PREVENT TRUCK TIRE FAILURES. 16 pages. B. F. Goodrich Company, Akron, Ohio.

PORTABLE AIR COMPRESSORS. 20 pages. (Catalog 42-PA). Schramm, Iron Works, Minneapolis, Minnesota.

DIAMOND DUAL-ACTION CRUSHER. 4 pages. (Bulletin D-44M.) Diamond Iron Works, Minneapolis.

J & C HIGH PRESSURE STEAM KILN REDUCES CURING PERIOD FROM DAYS TO HOURS. 8 pages. Jackson & Church Company, Saginaw, Michigan.

LITTLE GIANT VIBRATING CONCRETE BLOCK AND TILE MACHINE. 8 pages. Appley-Owens Corporation, St. Petersburg, Florida.

RECENT PATENTS

Gyratory crusher. Alexander J. Roubal, Wauwatosa, Wis., assigner to Allis-Chalmers Mfg. Co. No. 2,342,371.

Crushing machine. Edward T. Peterson, Reading, Pa. No. 2,343,322.

Mine car. Robert A. Shields, Bloomsburg, Pa., assignor to American Car & Foundry Co. No. 2,343,876.

Grinding mill discharge. Starks L. Miller, Denver, Colo. No. 2,344,162.

Mixing plant (for aggregate classifying and proportioning). Harry H. Barber, Aurora, Ill., assignor to Barber-Greene Co., Aurora. No. 2,344,228.

Material digging and handling apparatus. Stephen Grubich, Milwaukee, Wis. No. 2,344,246.

Mixing machine. Daniel C. Jones, Port Washington, Wis., assignor to Koehring Co., Milwaukee, Wis. No. 2,344,307.

History of Warner Company Linked with Delaware River

ALTHOUGH the Warner Company's activities have changed radically since this enterprise was founded 150 years ago in Wilmington, Delaware, in 1794, water transportation on the Delaware River has always been the backbone of an important segment of its business.

According to Scharf's history of Delaware "a packet line between Wilmington and Philadelphia was established in 1776 and is now [1885] known as Warner's Philadelphia and Wilmington propellor line." In addition to passenger and freight service between these two cities the firm conducted a general trade in numerous goods and in 1800 schooners were dispatched to the West Indies.

In 1869 24-hour service from Wilmington and Philadelphia to New York was established by the formation of the Wilmington Steamship Company of Delaware through a partnership of William Baird and Charles Warner & Company. A wharf at Market Street and the Christina River was the Wilmington terminus of the packet line and through the years this has continued to be Warner's Wilmington location.

In 1833 the Warner firm began to load sand on its schooners from the New Jersey shore, transporting this material for sale in the Wilmington markets. About the same time it also began to bring in lime for making lime mortars. The Warner Company was one of the first importers of Portland cement, which was brought over from England in 1865.

Since Warner's lime business kept pace with its sand business the company's position as sales agent, with no control over production or quality, was unsatisfactory and in 1899 it purchased the Cedar Hollow Lime Company. In 1904 Warner purchased the McCoy Lime Company and in 1908 the Keystone and Whiteland Lime Companies. Through an agreement made in 1922 with the American Lime & Stone Company, the Warner Company began to operate the high-calcium lime plants and quarries at Bellefonte, Tyrone, and Union Furnace in Pennsylvania, and in 1935 acquired complete control of that company.

As concrete became recognized more and more for its excellence as a construction material a rapid increase in the demand for sand and gravel resulted. Better to control the production, delivery, and quality of sand and gravel during the early part of this century the Warner Company expanded its holdings of companies and plants in this field in the upper Delaware River tidal area. The largest consolidation was with the Van Sciver Corporation in 1929, which brought about marked economies as well as improved service to its customers.

During the past twenty years the Warner Company has specialized in developing the modern technique of mixing concrete under controlled conditions at central plants and in delivering this improved product by revolving-drum mixing trucks. Cooperation with, and the ultimate acquisition of, the West Jersey Sand & Supply Corporation, with several retail plants in Philadelphia, completed the links in production, transportation, and retail distribution of concreting products in the Delaware River area.

CHARLES WARNER, president; IRVING WARNER, vice-president in charge of purchasing and engineering.

ALFRED D. WARNER, JR., vice-president and treasurer; REED C. BYE, vice-president in charge of sales.

ALEXANDER FOSTER, JR., vice-president in charge of production and distribution; JOHN CURTIN, JR., vice-president in charge, Bellefonte Division.

The Warner Company now has active plants at Bellefonte, Pennsylvania, from which comes high-calcium lime, at Cedar Hollow and Bridgeport, Pennsylvania, from which comes dolomitic lime; and at Morrisville, Pennsylvania, where the Van Sciver and Terminal Plants supply sand and gravel to barges for transportation to yards in Philadelphia and Wilmington. In addition to these plants there are numerous yards which supply Philadelphia with building materials, while near the Van Sciver Plant the Morrisville yard produces concrete and makes deliveries in the Trenton, New Jersey, area.

It is interesting to note that, of the thousand or more employees the Warner Company has at this time, 141 have been associated continuously with the company for over 25 years.

Bellefonte employees with over 25 years of service were honored at a dinner recently. Standing from left: Joe Drogan, George Kellerman, John Dunn, Joseph Blazina, Robert Kucas, John Gordon, Orvis Reed, Harry Frazer, G. I. Purnell, Morris Auman, Geo. C. Bingaman, Jacob Gordon, Steve Knapik, and Al. Smith. Seated, left to right: Antonio Gianfelice, Joseph Fernolio, James McNichol, Irving Warner, Charles Warner, John McNichol, and Steve Worrick.

WHEN YOU CHECK UP ON YOUR PLANT'S PAY-ROLL SAVINGS PLAN FIGURES!

These days, things change with astonishing speed. The Pay-Roll Savings Plan set-up that appeared to be an outstanding job a short time ago, may be less than satisfactory today.

How about checking up on the situation in *your* plant? Checking up to see if everybody is playing his, or her, part to the full measure of his, or her, ability. Checking up to see if 'multiple-salary-families' are setting correspondingly multiple-savings records.

A number of other groups may need attention. For example, workers who have come in since your plant's last concerted bond effort. Or, those who have been advanced in position and pay, but who may not have advanced their bond buying accordingly. Or even those few who have never taken part in the plan at all. A little planned selling may step contributions up materially.

But your job isn't finished, even when you've jacked participation in your Pay-Roll Savings Plan up to the very top. You've still got a job before you—and a big one! It's the task of educating your workers to the necessity of not only buying bonds, but of *holding* them. Of teaching your people that a bond sold before full maturity is a bond robbed of its chance to return its full value to its owner—or to his country!

So won't you start *checking* . . . and *teaching* . . . today?

War Bonds To Have And To Hold!

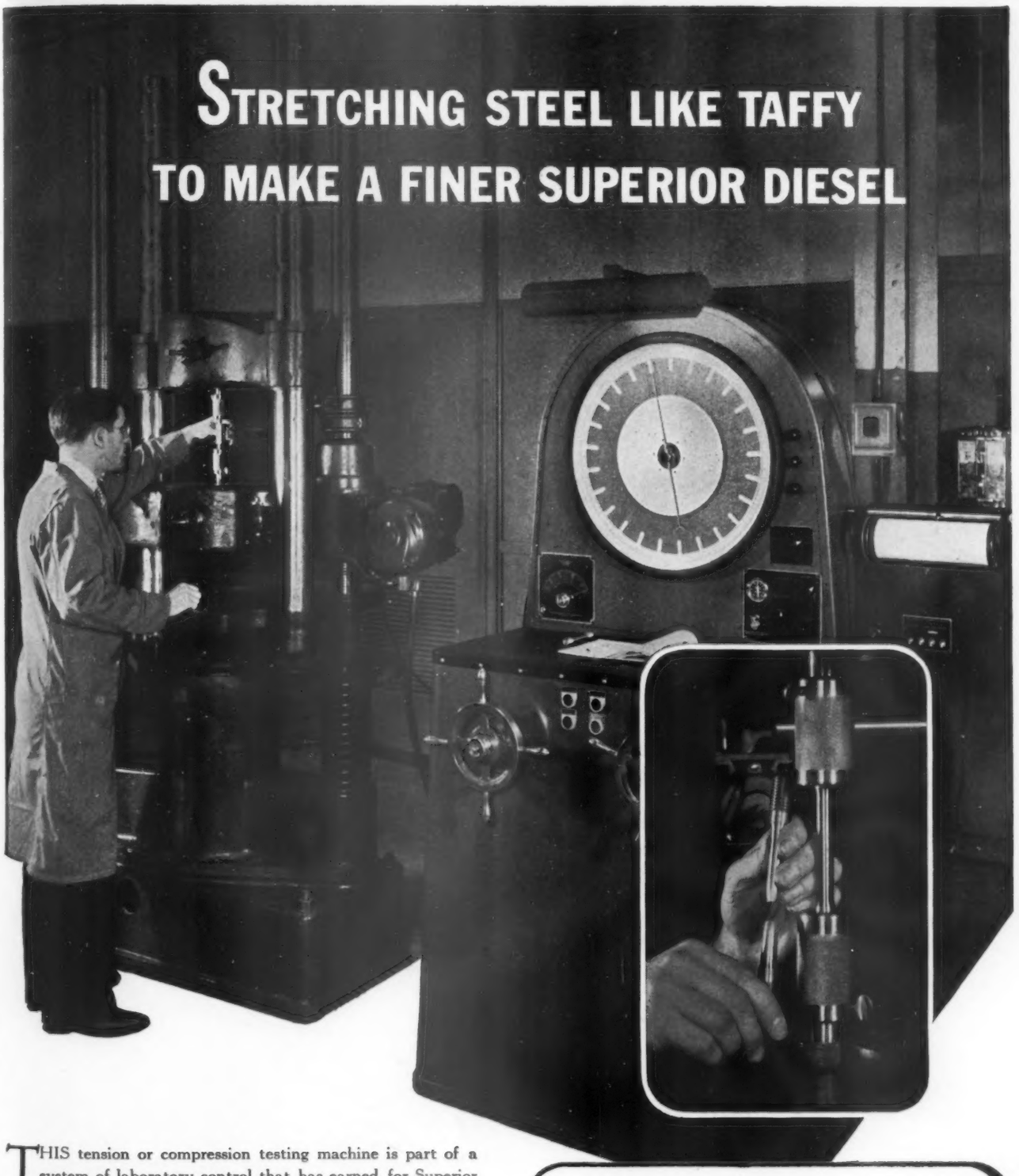
LET'S ALL BACK THE ATTACK WITH WAR BONDS!

The Treasury Department acknowledges with appreciation the publication of this message by

PIT AND QUARRY

This is an official U. S. Treasury advertisement—prepared under auspices of Treasury Department and War Advertising Council

STRETCHING STEEL LIKE TAFFY TO MAKE A FINER SUPERIOR DIESEL



THIS tension or compression testing machine is part of a system of laboratory control that has earned for Superior engines a reputation for excellence unsurpassed by any other Diesel. This equipment is capable of determining the breaking point of a single horse hair or a 1-inch bar of high strength alloy steel. What does this mean to you? Just this: There are no unknown factors in a Superior Diesel. Its economy, dependability and ruggedness have been proven time and again, not only in our laboratory, but in power installations all over the world.

SUPERIOR ENGINES

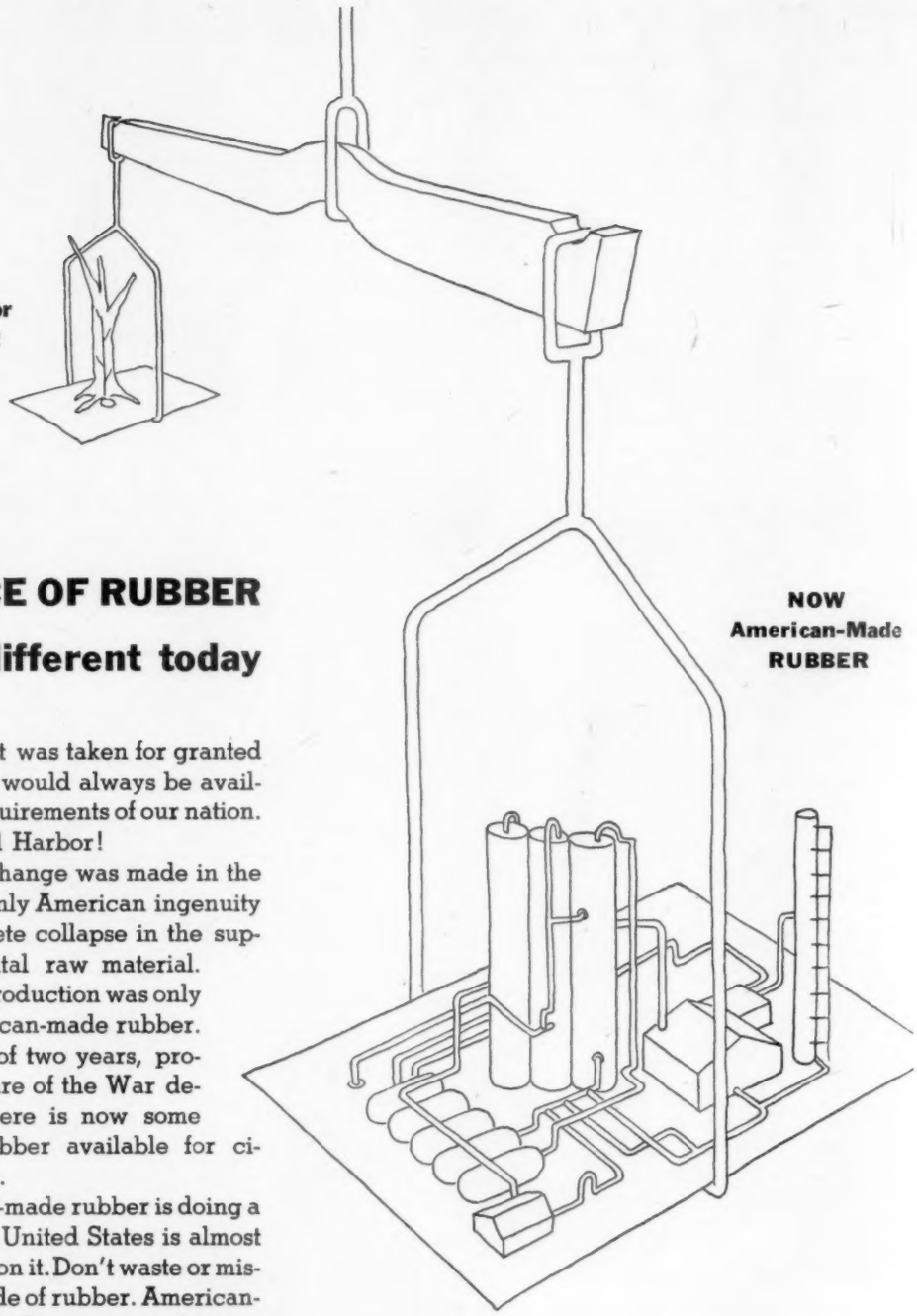
Division of The National Supply Co.

Executive Offices: Pittsburgh, Pa.

Sales Offices: Springfield, O.; Boston; New York; Philadelphia; Washington, D. C.; Jacksonville; Houston; Ft. Worth; Tulsa; Los Angeles; Chicago.
Factory: Springfield, Ohio.

Superior **DIESELS** • STATIONARY, 31 to 1160 H. P.

MARINE, 28 to 1160 H. P. • GENERATOR SETS, 12½ to 770 kw.



THE SOURCE OF RUBBER

. . . different today

For many years it was taken for granted that Crude Rubber would always be available to meet the requirements of our nation.

Then came Pearl Harbor!

Instantly a vast change was made in the source of supply. Only American ingenuity prevented a complete collapse in the supply of this most vital raw material.

At the start, the production was only a few tons of American-made rubber. In the short space of two years, production is taking care of the War demands. Besides, there is now some American-made rubber available for civilian requirements.

Today, American-made rubber is doing a wonderful job. The United States is almost entirely dependent on it. Don't waste or misuse any product made of rubber. American-made rubber uses American-made raw materials and American Labor and keeps the money in circulation in America.

Quaker for many years has been most active in experimenting and working with American-made (Synthetic) rubber. In many instances, it has already proven better for certain kinds of work than Crude.

When you need Industrial Rubber Products, consult Quaker. Even during these trying days, Quaker has been able to supply Industry with a considerable quantity of Rubber Products, in addition to the large volume of products which we are constantly supplying the Government.

If there is a way to get it done—Quaker will do it!

QUAKER RUBBER CORPORATION

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Uniform MOISTURE

In Washed Sand for Concrete

CUTS TIME & COST

in mixing

Control the moisture with

AKINS *Classifiers*

WHEN you talk business to large users of sand for concrete there's a tremendous sales advantage in being able to say that you can supply sand of uniform moisture content — and make it stick. Every contractor knows that moisture content of sand either causes variation in tests or adds time and cost in mixing — or both.

AKINS Classifiers, long identified with the dressing of practically all metallic ores, are finding increasing favor in sand washing because they are mechanically adapted to CONTROL OF MOISTURE. AKINS Classifiers are also particularly suited to washing sands specified to close separation, as for glass making.

AKINS Classifiers do not require unloading to start after shutdown. This is particularly advantageous for sand plants not operating 24 hours a day. Considering their high tonnage output, power requirements are absurdly low.

In writing for further information, please state your washing problem.

We also manufacture:
SKINNER MULTIPLE HEARTH ROASTERS; LOWDEN DRYERS; BALL, ROD & TUBE MILLS; SMELTING EQUIPMENT; CRUSHERS & ROLLS; DIAPHRAGM PUMPS.

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★ ★ ★ Have You Seen The Dempster-Dumpster Work?

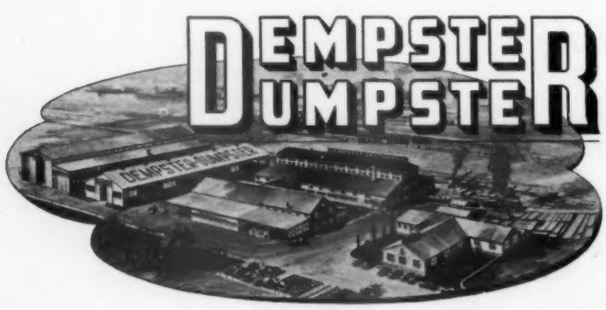
★ ★ ★ Have You a Truck with Twenty-Five Bodies?

If the materials you handle within your plant are rock, gravel, sand or any other, you'll do it faster and at tremendous savings with the Dempster-Dumpster system!

If you are doing the job now with even three, four or five trucks, the chances are that you can do it better with only one truck the Dempster-Dumpster way. Yes, with only one of your present trucks equipped with a Dempster-Dumpster Hoisting Unit, and with six, twelve, twenty-five, or any number of Dempster-Dumpster bodies your particular operation may require, you can do the job better while you save on trucks, tires, gas and precious manpower.

If you have never seen the Dempster-Dumpster work, then you can't comprehend its efficiency or how simply and easily it can be adapted to your use.

Let us tell you where you can see this remarkable materials handling equipment in actual operation.



DEMPSTER BROTHERS, Inc., 154 Springdale, Knoxville 17, Tenn.

Make wire rope last . . . keep it on the job

Sharing your wire rope with the armed forces doesn't mean going without; it just means taking *care* of what you have. For example, inspect it often. Lubricate when indicated. Operate at capacity, but don't overload.

When you must replace a rope, get *Preformed* Yellow Strand for heavy-duty quarry jobs. It's strong, flexible, highly resistant to kinking and fatigue—qualities that result in long rope life. Specify *Preformed* Yellow Strand for hoist and drag lines on your dragline machine . . . for holding and closing lines on clam shells . . . for hoist and swing lines and as rack and crowd ropes on power shovels. B & B engineers will gladly help you *choose* the right rope and *use* it right.

Broderick & Bascom Rope Co., St. Louis

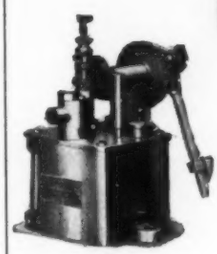
Branches: New York, Chicago, Houston, Portland, Seattle
Factories: St. Louis, Seattle, Peoria

YELLOW STRAND
PREFORMED WIRE ROPE

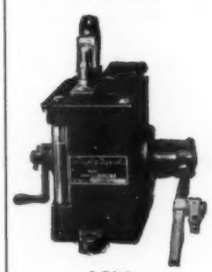
Are Your Lubricating Schedules Followed Strictly?

LUBRICATE THE SURE WAY!

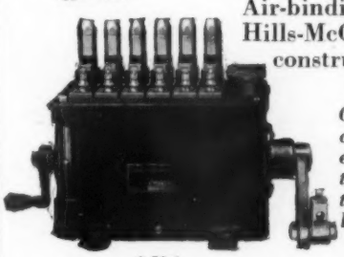
with *The Pioneer*
HILLS-McCANNA FORCE-FEED Lubricators



2 Pint
Single Feed
Model "MB"
Ratchet Drive



2 Pint
Single Feed
Model "ET"
Type "VSF"



8 Pint
6 Feed
Model "ET"
Type "VBFT"

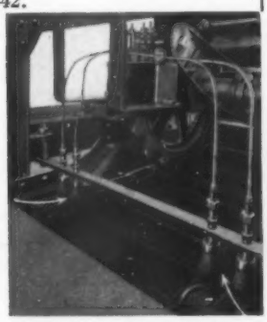
Hills - McCanna Force - Feed Lubricators Never Forget a Bearing or Friction Point Regardless of Location!

Neglect is eliminated — so is over dosing or under dosing. Pumps, Compressors, Crushers, Engines, Vibrating Screens, Conveyor Chain, and other portable and stationary equipment, are safeguarded . . . breakdowns are avoided.

Hills - McCanna Force - Feed Lubricators are famous for their dependability. There is no guess work. Each pump valve is an independent unit . . . supplying metered amounts of oil to delivery point *on time — all the time.* Air-binding is impossible in Hills-McCanna design and construction.

Our engineers can offer you over 3 score years of experience in mechanical lubrication. Feel free to call on them or write for Catalog L-42.

Hills-McCanna Positive Lubrication applied to heavy duty Lidgerwood Hoists. Lubricator shown is a 6 feed Model "ET." The feeds oil 6 bearings from a central point.



4 feed, chain and sprocket driven, Model "MB" Lubricator, oiling linkage on apron conveyor.

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MAY, 1944

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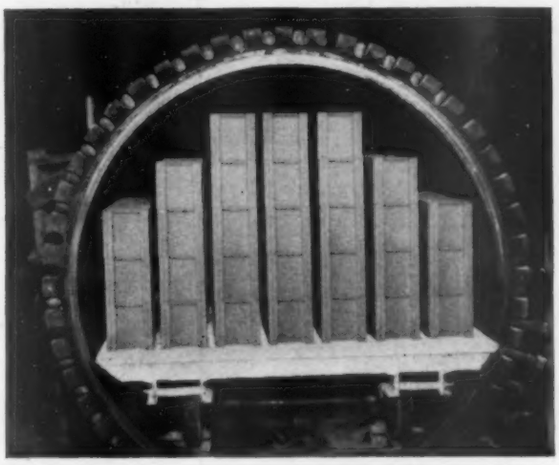
HIGH PRESSURE
STEAM KILNS
Reduce Curing Period for Concrete from DAYS to HOURS



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The CONCRETE MANUFACTURER

MAY, 1944

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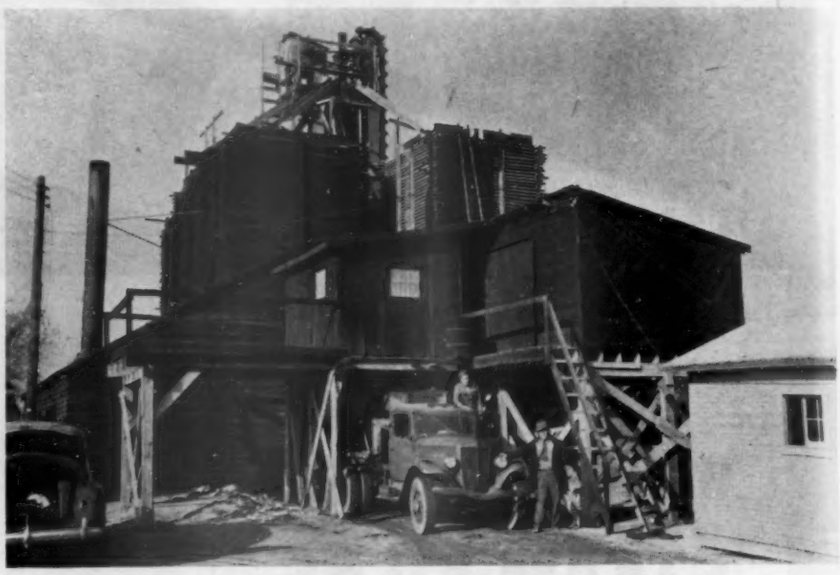


Burnside-Bock Company plant at Seymour, Indiana.

New Commercial Plant at Seymour, Indiana

E. A. Bock, associated with E. T. Burnside in the operation of a ready-mixed-concrete plant at Seymour, Indiana, which was set up to supply material for Freeman Field, an army airport near Seymour, has purchased the controlling interest in the firm and is now operating it as a commercial venture. The firm has been incorporated as Burnside-Bock Company, Inc.

The plant, largely of timber construction, has a 20-cubic yard receiving hopper for aggregates, two storage bins each of 175 tons capacity, and three batching bins. Batching of the aggregates is done with Butler equipment, sacked cement being loaded into the mixers through a spout. Two Blaw-Knox truck-mixers are in regular service while additional units are available on a rental basis should the demand warrant. Aggregates are purchased.

Before joining the firm, Mr. Bock was connected with the U. S. engineers office at Louisville, Kentucky.

Chattanooga Products Maker to Expand

The Chattanooga Building Block Company, one of Chattanooga's newest industries, has made plans to step up its production about 300 per cent. if the necessary equipment can be purchased, T. W. Norris, manager, has announced.

Established only about three months ago the plant is operating at capacity—2,000 units a day—and can not meet the demand, which is exceptionally heavy in that area this spring. Plans are now being made to enlarge the curing kiln and put on a night shift. Machinery will probably be purchased secondhand since the new machines of the type needed are not available due to the war, Mr. Norris explained.

The new enterprise is owned by T. W. Norris and J. E. Norris, the latter being secretary-treasurer. The two are partners in Norris Brothers, a brick contracting firm, in business for some 17 years.

The block company purchased a site 580 by 150 feet, which provides space for future expansion and, after the war, is interested in the possibilities of using river transportation to ship its products out and receive raw materials.

The company now produces concrete and cinder units of four different types. It plans to add cast stone coping to its line and, later, take on other products. The new industry, Mr. Norris explains, fits in nicely with the contracting firm, for Norris Brothers will be able to use some of their own products in building operations.

This Block Plant, Built in 30 Days, Sold 1,000,000 Units in Six Months

This is the new plant of the Knox Concrete Products Company. Long inclined conveyor at right carries sacked cement.

By HARRY F. UTLEY

MORE than 1,000,000 concrete-masonry units produced in the first six months of operation!

That is the record achieved by the new plant of the Knox Concrete Products Company of Knoxville, Tennessee, which was rushed to completion in 30 days and began producing in August, 1943.

The owners of this new concern—W. F. Moehlman of Knoxville, Casey Hardcastle, Jr., and L. G. Boxwell of Nashville, and Brantley P. Smith of Jackson, Tennessee—had won a contract for 300,000 Superock units before the plant was built or even designed. This order was completed in less than 50 working days and by that time other contracts had been obtained which have kept the plant busy 10 hours daily, with a 10-hour night shift also working a part of the time. Nearly all the production to date has gone into foundations for government-financed housing in connection with the huge Clinton Engineering Works war project near Knoxville.

Two of the present owners formerly operated a concrete-products plant near Jackson, Tennessee, and this plant was stripped of much of its equipment for installation at Knoxville because of the inability of getting the needed new machinery in a hurry.

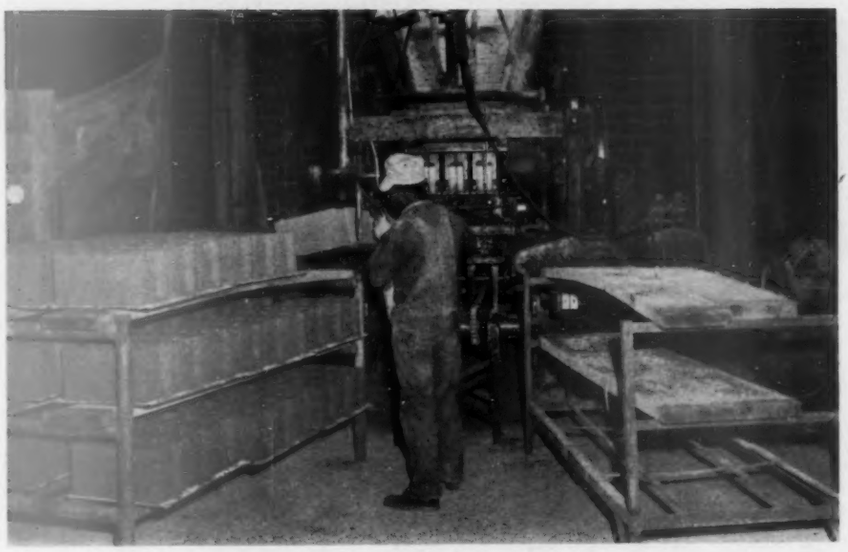
The site of the plant is a 7-acre tract just inside the western corporate limits of Knoxville. The entire plant was built of concrete, the blocks used in its construction having been shipped from the Jackson plant. Bin structures, plant floors and the yard runways are of concrete. The equipment was laid out to provide ample working space, but was not spread out too much to hamper efficiency.

The two stoker-fed boilers.

The eight curing rooms, four on each side and at right angles to the service runway, are 60 feet long, 9 feet wide, and 6½ feet high with rock-wool insulated roofs. They have a capacity of 6,500 units per 10-hour shift, the blocks usually remaining in the kilns for a 5-hour period. Steam coils supply the heat and a drilled pipe releases steam to provide the curing moisture. Tarpaulins are used for closures. The steam is generated in two locomotive-type boilers coal-fired by Stokol automatic stokers.

In conformity with government specifications, all the blocks made so far for the Clinton job have an aggregate content composed of a blend of Superock (a light-weight slag shipped in from Birmingham) and limestone screenings. Only the fine grade of Superock is used, the stone, which is graded from ⅜ inch downward, supplies the coarser particles. The limestone is received in hopper-bottom cars already graded and blended by the shipper, the American Limestone Company of Knoxville.

Septic tank and forms in the yard.



One of the vibration block machines. Steel racks in foreground.

Unloading some of the original wooden racks in the yard.

Aggregates are discharged into two pits — one for Superock and one for limestone — and two short Barber-Greene belt-conveyors carry them to the receiving bins. These have a combined capacity of about six carloads. Two belt-bucket elevators lift the two aggregates about 50 feet and discharge them into the 130-cubic yard plant-storage bin which is divided into four compartments.

Batching is done by volume with Heltzel equipment which moves on overhead rails so that it can discharge into any of three mixers arranged in line. Two 20-cubic foot mixers serve the Besser Vibrapac machine on the floor below and a 28-cubic foot unit supplies a Stearns No. 9 Joltcrete machine.

High-early-strength cement is used exclusively. This is received in cloth bags which are carried direct from box-cars to the mixing floor by an inclined belt-conveyor. The cement is added to the mix by hand and the bags are immediately cleaned in a power-driven sack cleaner for return to the cement plant.

Steel pallets are used for both production machines and these are cleaned with an acid solution after using, rinsed with clear water and re-oiled before being stacked at the molding machines.

In the rush to get into production a large number of wooden racks were hastily constructed, but these are gradually being replaced by more wieldy steel units. Barrett-Cravens hand-operated lift trucks and two power-driven machines—a Clark gasoline-engine model and a Crescent battery-powered truck — carry the racks into the curing rooms, the yard, and back to the production floor.

Precast lintels and septic tanks are also produced at the plant. Concrete for the lintels is poured into wooden forms and compacted with an electric vibrator. The septic tanks are of a special design made in steel forms built and patented by L. A. Warren of Nashville. Hundreds of these tanks, reinforced with wire mesh, have been made for use on the Clinton housing project. Only one large model, capable of disposing of the sewage of a six-member family, is produced. The tanks are poured in the open, the inner and outer forms are stripped, and the concrete tanks are left in their original positions to cure.

A spacious detached office building of the residential type was also built of concrete masonry and it is as attractive in appearance as is the plant proper.

R. L. Watson is the office manager and Mr. Smith, one of the owners, serves as general manager of the plant. Few sales have been made so far other than those contracted for in volume since practically all the output goes to the Clinton project. When the rush of filling war orders subsides the company plans to launch an intensive sales-promotion program since it expects to remain in business permanently and its large production capacity will doubtless require much aggressive merchandising to keep sales at a corresponding high level. Its owners are executives of the "go-getter" type, or they would have been unable to break into a new era and snatch the important contracts they did from under the noses of established operators before they even had a local plant, and that they will be an important factor in the Knoxville building field appears a certainty.

Attractive office of the Knox Concrete Products Company.

It's Planting Time

By WM. DAVIDSON

Safety Engineer, Portland Cement Association

A plant and a "plant" react similarly to spring.

Springtime again beckons us to join-up with the forces of nature that we may attain the reward of a full harvest.

The analogy of safety to the manner of working our garden is quite clear. If we plow deeper, we bring to the roots new sources of nourishment. If we look deeper into the causes of our industrial mishaps, we will recognize new ways of avoiding them. If we are to obtain increased yields we must restore the elements which continual cropping has taken away.

Safety is as continuous as the seasons, and we must constantly add to our knowledge of the science of safety in order that we may draw upon new sources of information in stopping accidents.

The pests which inhabit our garden are quite similar to the little irregularities which are trying to gain our attention, almost daily, in the form of pinched fingers and toes, indicative of improper methods or unsafe acts. Disregarding them will only result in loss.

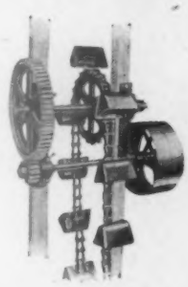
As we contemplate the fruits of labor let us remember that in gardening as in safety our roots must find the rich soil of co-operative effort and that the weeds of disinterest and dwarfed effort must be continually removed lest they reproduce their kind.

The effect of a coat of paint is as magic as the unfolding of a flower. Many successful companies choose this time of the year to touch up certain parts of the plant, particularly where men meet. It might be worth while to look at the change room, clock room and other points which employees frequent each day. A coat of wax on locker doors carries the unspoken yet forceful message of management's interest in catching the spirit of a new season.

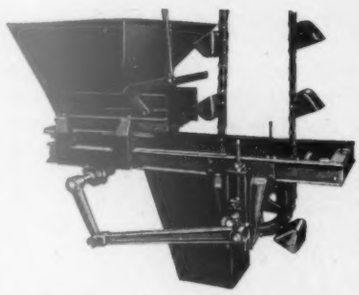
Conveyors which carry aggregates from rail pits to bins.

Some of the curing rooms at the Knoxville plant.

AGGREGATE ELEVATORS



Kent Top Drive



The Kent Elevator Feeder

THE KENT MACHINE CO.
Cuyahoga Falls, Ohio

Urges Federal Aid Funds be Allocated

Appearing before the House Roads Committee at Washington, D. C., on March 3, H. G. Sours, Director of the Ohio State Highway Department, urged that federal aid highway funds continue to be allocated by formula rather than on the basis of need.

"We recognize," Mr. Sours said, "that the formula may result in some inequities. On the other hand such inequities as may arise would not compare with those which could arise under the 'need' plan, which can readily lead to pressure and favoritism regardless of actual highway needs."

Briefly reviewing the history of the formula, Mr. Sours said that the present maxim, which gives equal weight to each of three factors, area, post-road mileage and population in the respective states, has, with some temporary modifications, been carried on through each successive enactment of federal aid highway legislation since the original act of 1916. The growing need for the development of urban highway facilities, particularly the trunk-line and expressways through the cities, the local and feeder-road problem and the changing pattern of needs on the federal aid system generally, all suggest only one logical conclusion: the formula needs changing.

Mr. Sours pointed out that the urban problem calls for separate and different treatment from the regular federal aid and rural highway problems, and that there is a corresponding need for a separation of items in the appropriation and for separate formulae. He suggested that a part of the total could be allocated under the formula recommended by the American Association of State Highway Officials, using the same factors but giving one-half the weight to population, one-fourth to area and one-fourth to post-road mileage, and a part under the so-called "urban" formula.

In connection with the latter, Mr. Sours urged that some control be exercised over the allocation of urban and of secondary road funds within the states. Subject to sound regulation, he concluded, there should be the maximum of flexibility in the use and allocation of funds.

The new ready-mixed-concrete plant of Lowe & Bell has gone into operation at Roseburg, Oregon.

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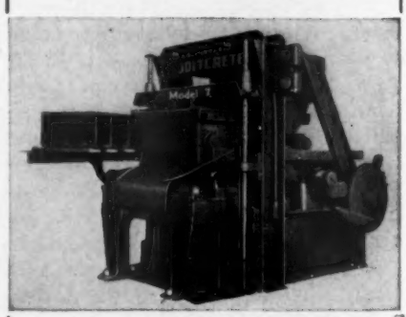


Vibration under pressure — 7,200 blows per minute—and ruggedly built to give long life, the Joltcrete machine is the choice of the wise concrete-products operator. Produces clean-cut, high strength units in any size, and gets the most out of a bag of cement. Built in three sizes with capacities of 7 to 9 standard units per minute.

Hobbs block machines, Anchor tampers, Anchor Jr. strippers, Stearns power strippers and Joltcrete, Stearns mixers and Cast Iron and Press Steel pallets, Straublox oscillating attachments, etc. Repair parts for: Anchor, Ideal, Universal, Stearns, Blystone mixers and many others.

ANCHOR CONCRETE MACHINERY CO.
G. M. Friel, Manager — Columbus, Ohio

Asbestos Products Have Good Year

Figures on 1942 and 1943 production of nine asbestos building products were recently released by the War Production Board's Cork, Asbestos, and Fibrous Glass Division. Data are based on monthly reports from all major producers and represent virtually the entire production in each field. There is at present sufficient supply of asbestos fiber to meet all necessary requirements for these products. The industry is faced with some manpower problems, but most plants are not situated in areas where manpower is critically short. Production figures follow:

Asbestos cement shingles and clapboard: 1942, 3,386 squares (material to cover 100 square feet); 1943: 2,451 squares.

Asbestos cement corrugated sheets: 1942: 550 squares; 1943: 380 squares.

Asbestos cement flat sheets and wallboard: 1942: 115,500 square feet; 1943: 161,700 square feet.

Hi-temperature insulation pipe covering: 1942: 34,800 tons; 1943: 33,800 tons.

Hi-temperature insulation blocks: 1942: 56,600 board feet; 1943: 49,400 board feet.

Asbestos paper pipe covering: 1942: 37,500 linear feet; 1943, 34,100 linear feet.

Asbestos paper sheets and block insulation: 1942: 5,400 board feet; 1943: 3,800 board feet.

Asbestos paper: 1942: 87,300 tons; 1943: 91,200 tons.

Asbestos millboard: 1942, 17,400 tons; 1943: 22,000 tons.

American Industry Is All-Out to Win War

A vast amount of praise and publicity has been accorded to manufacturers of strictly peace-time products who have converted their plants to the production of war-time necessities. Little has been said about the manufacturer whose normal output is essential to the demands of war, but who desires to do even more to help speed the victory.

A case in point is Robins Conveyors Incorporated, manufacturer of materials handling machinery, whose normal output — conveyors, bridges, car dumpers, vibrating screens and a long list of other products—is essential to quantity production in many war plants. In addition they manufacture windlasses, capstans, ship steerers and other deck machinery for the maritime part of the war effort.

When the Navy approached Robins with a request that they manufacture certain of the precision parts required in the production of vitally-needed binoculars, the company readily agreed to undertake the production of several hundred thousand parts made from aluminum drawn-tubing to the most exacting specifications. The demand for an unblemished surface on these parts was so strict that each item had to be wrapped individually in paper to prevent surface friction, and some of the parts had screw threads so minute that they could scarcely be seen with the naked eye.

By careful shop-planning and scheduling, by operating every machine tool to the limit of its capacity, this company succeeded in taking on an added load in the all-out drive for war production, without impairing in any way its regular output of materials handling machinery.

In such ways as this American industry, working under a free economy, is hastening the collapse of totalitarianism.

ROAD shocks that bounce and jar the drum . . . strains from pulling over uneven ground on the job . . . can be mighty expensive to truck mixers if transmitted directly to the transmission, power plant and other vital working parts.

REX MOTO-MIXERS are protected against such damaging road shocks by the exclusive chain belt drive that goes completely around the drum . . . providing a cushion that absorbs all shocks and strains . . . assuring minimum repairs and maintenance.

In fact, so important, so valuable is this chain drive that REX MOTO-MIXER owners say that this one feature alone—*and there are many others*—would be enough to make REX MOTO-MIXERS their choice.

Other important advantages of REX MOTO-MIXERS? The Rex end charging hopper, the exclusive Hi-Lo mixing action . . . 100% accurate water system . . . 5-in-1 Quint Spout, and many other features that make Rex the leader in the truck mixer field. For complete information about the chain belt drive and the other outstanding Rex features, send for your free copy of Bulletin 405. Write Chain Belt Company, 1646 W. Bruce St., Milwaukee 4, Wis.

CHAIN BELT COMPANY OF MILWAUKEE

REX CONSTRUCTION MACHINERY

A general view of the Ludington plant, office and garage.

Concrete Firm Exercises Painstaking Care in Proportioning of Materials

another ON THE SPOT report

IN EVERY industry there are those who see clearly the important trends as they develop and adopt improved methods and equipment as they become available. This has been the policy of I. M. Ludington Sons, Inc., ready-mixed-concrete producers of Rochester, New York. After having been general contractors on heavy construction work since early in this century this company in 1938 dropped out of this field and built a new concrete-batching plant at its yard at 720 Lexington Avenue, near growing residential and industrial sections of Rochester.

In common with many other operators they soon experienced difficulty in regulating the amount of mixing water per batch because of the wide variations in the moisture content of the aggregates used. Unauthorized efforts of the truck drivers to correct dry batches by adding water from the truck-mixer tanks did nothing to improve the situation. After considerable experimentation with various control methods the company installed the system of the Scientific Concrete Service Corporation. This went into operation in November, 1941, and proved to be the solution to the problem.

In other ways the company has also set the pace for other producers in this area. Before its entry into the field all the ready-mixed concrete produced in Rochester is said to have been plant-mixed and was delivered in bath-tub or ordinary end-dump truck bodies. The original plant soon proved to be too small to meet the growing demand, and other improvements were made. The original fleet of two 1½-cubic yard truck mixers was increased to five before the end of the first year. Now the company owns 11 mixers and rents others during periods of peak demand. Ten are Jaegers and one is a Chain-Belt Rex machine. Nine are standard horizontal-type mixers —3 or 1¾-cubic yard, 5 of 2¾-cubic yard, and 1 of 3½-cubic yard capacity, and two are 2¼-cubic yard high-dump mixers. Six International and five Ford truck chassis are used. Comparatively small mixers are used because most of the concrete sold is used in small projects and because of the load restrictions on river bridges and streets which would require long detours if larger machines were used. The plant has a capacity of over 60 cubic yards per hour and has produced 560 cubic yards in an 8-hour day.

Scale on cement weigh batcher. Recorder above.

The bulk cement used in this plant is received in special hopper-bottom cars on a siding from a railroad near the plant. A new Butler cement-unloading and storage system is used and this consists of a screw-conveyor and bucket-elevator feeding into a 3-compartment bin with a total capacity of 700 barrels. Standard and high-early-strength Portland cements and Universal Atlas Duraplastic air-entraining (Vinsol-resin) cements are stored. The latter type of cement has rapidly become more pop-

ular since it was introduced to this area a few months ago and is now used for nearly all the concrete for house construction and paving. When ordered, about a cup of Truscon Laboratories Zilicon waterproofing paste is added for each bag of cement.

Sand and gravel are used as aggregates except when others are specified and is delivered in trucks from local sources. At the plant the trucks are backed up a ramp and dump their loads into 8 storage bins with a combined capacity of 1,000 tons which are sunk 8 feet below ground level. These bins have wooden sides and steel bottoms. Steam pipes below the bins are used to thaw out the aggregates in cold weather. The water draining out of the stored material flows into a sump and thence into the city sewers.

Making a moisture-determination test.

Usually two types of sand, two sizes of gravel and four sizes of crushed stone are stored. At times ⅜-inch Silicrete, made by the Industrial Silica Corporation, is stored for use in concrete for floor topping and similar work.

A Brownhoist 1-cubic yard steam locomotive crane feeds the aggregates from these bins to the 5-compartment, 130-ton Butler bin which was built up from the original 3-compartment bin.

The batching of the concrete ingredients is a 1-man operation with the $(SC)^2$ system but when the demand approaches the 65-cubic yard per hour capacity of the plant a second man is required to conduct the tests which form an important part of this control system. The only other man required at the plant is the crane operator.

The cement is fed from the bin compartments by three 10-inch screw-conveyors to the 2,000-pound-capacity cement-weighing batcher. The screw-conveyor motors have push-button controls but are not electrically interlocked. The batcher has an $(SC)^2$ Toledo dial scale which is equipped with an Esterline-Angus recorder to register the amount of cement in each batch.

The aggregates are discharged through gates under each of the 5 compartments into the 3½-cubic-yard - capacity aggregate - weighing batcher. This has attached to it a 135-gallon compartment for the mixing water. This water is obtained from the city mains at 80 pounds pressure and goes first into a tank which is used for heating it in cold weather. Following this is a 1,000-gallon tank with float-valve control. From the last-mentioned tank the water is fed through a 4-inch pipe and a quick-acting valve into the batcher.

The aggregate-and-water batcher is also connected to an $(SC)^2$ Toledo dial scale. This scale is equipped with a moisture-compensation beam and has an Esterline-Angus recorder which automatically records the amount of aggregate and water and the moisture compensation for each batch.

The operator writes the weights of these ingredients and the amount of moisture compensation on the delivery ticket for each batch of concrete. In this way each batch can be checked at any time. An effort is also made to check the point in each job where each load of concrete is poured in order to guard against future trouble.

Moisture determinations of the aggregates are made every time the source or type of material changes or about 6 times daily in any case. During periods when the demand is high tests are made oftener as the aggregates do not then remain in the bins long enough for their moisture content to even out. These tests are

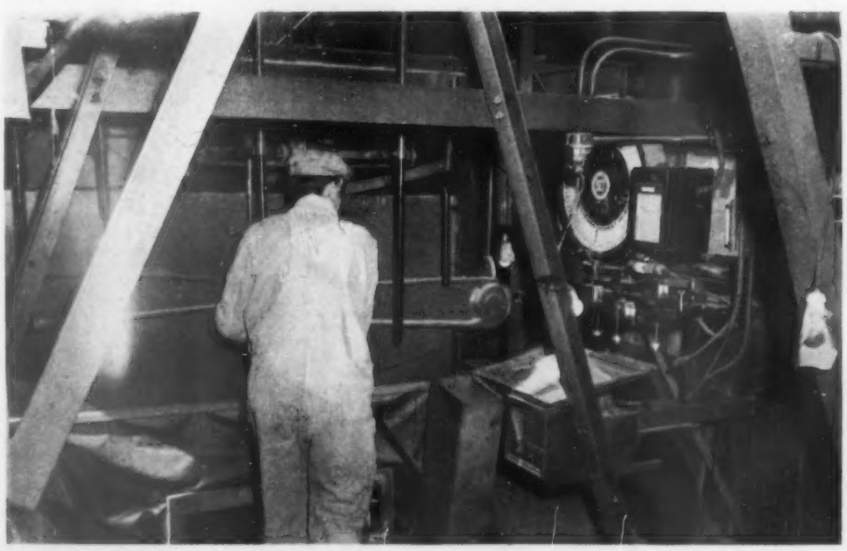
One of the high-lift truck-mixers being loaded.

made on the $[SC]^2$ Toledo moisture-determination scale which has been described in several previous articles.

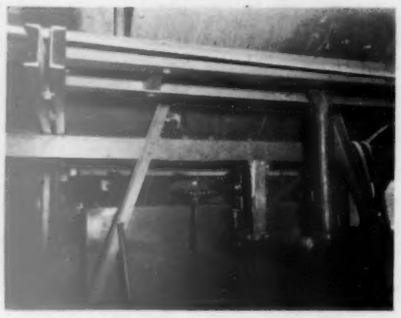
This is a 2-stop plant, but the entire operation of loading a truck-mixer takes less than 2½ minutes. The loading stations are so spaced that one mixer can be loaded with aggregates and water while another has moved ahead for its cement.

The cement spout system used is noteworthy. To the discharge spout is attached a telescoping spout consisting of four short lengths of rubber hose nested inside each other. This spout can be adjusted to any length from 15 inches to nearly 48 inches to fit any size or type of truck-mixer.

Every effort is made to prevent any upset in the designed mix on the way to the job. Direct loading of the water into the mixer is one precaution and on some jobs the mixer water tank is kept empty so no change in the water content of a batch can occur through leakage or for any other reason. Another step which has helped is the fact that each driver is assigned a specific



Aggregate weighing batcher. Scale and recorder for aggregates and water at right.



Pipe and quick-action valve which feed mixing water to 135-gallon compartment attached to aggregate weigh batcher.

truck-mixer and is responsible for it.

The company also operates a small concrete-batching plant at Penfield, east of Rochester, from which deliveries are made when any sizable demand develops in that area. For some of the larger jobs at some distance from either plant, aggregates have been batched into the mixers from producers' bins. Small temporary batching plants have also been used on a few distant jobs.

Charles I. Ludington, president of the company, is a grandson of its founder, I. M. Ludington. George A. Butler is vice-president and general manager, Mrs. Ruth L. Abbey is secretary, and Ward Carpenter is treasurer.

Armed Forces Demand All Cranes, Shovels

Practically all power cranes and shovels produced in 1944 will be needed by the armed services, the War Production Board reported March 10. The majority of manufacturers are building only a few models and sizes of standard products, and in general they are not able to meet delivery schedules promptly. These facts were brought out at the recent meeting of the WPB Power Crane and Shovel Industry Advisory Committee.

Civilian needs are filled for the most part from used equipment. The inventory of used equipment (registered under order L-196) lists approximately 25,000 cranes and shovels. However, not more than 10 per cent. of the machines in good condition are idle at the present time, and only part of this percentage is available for sale. Twenty-four representatives of the used machinery section of the Construction Machinery Division are stationed in WPB field offices to assist contractors in locating used equipment.

Shovels, cranes, draglines, tractors, and motor graders are the types of equipment most in demand.

[SC]² PRECISION CONCRETE CONTROL

FOR BETTER CONCRETE

Batches of these tolerances:
Dry weight of aggregates, ¼%.
Water, ½-gal. per cu. yd.—Yield, ¼%.

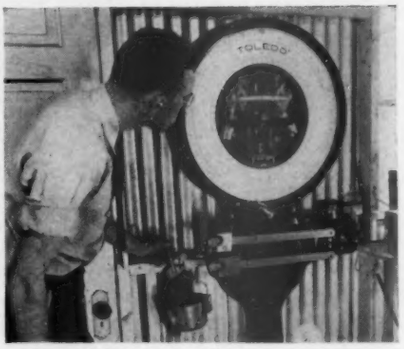
Saves Yield . . . You can set your mixes to a yield tolerance of ¼% and collect for concrete you now give away.

Saves Cement . . Most of the cement that has to be added to provide for the usual variation in the water-cement ratio. Substantial savings are often possible.

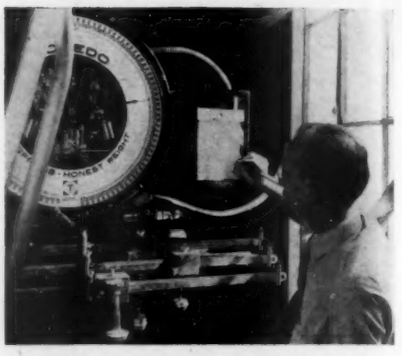
Saves Truck Time . Eliminates hold-ups to add water. Saves by fast accurate batching.

Saves Stock Piling . No longer necessary for moisture control.

Better Concrete—Faster Batching—Lower Cost



THE [SC]² MOISTURE METER. The only unit capable of determining moisture content in less than one minute.

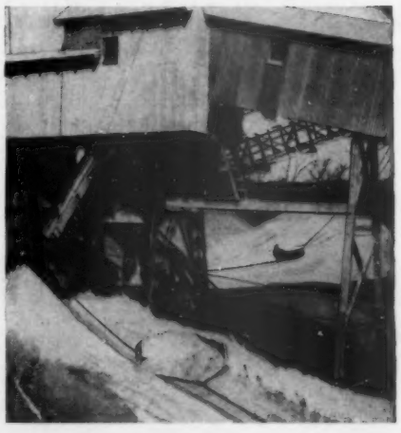


THE [SC]² COMPENSATOR which compensates for the moisture content in every ingredient and graphically records its every operation.

Get set for post-war competition. Let us show you what [SC]² Control has done for many small and large plants. Write today for free survey and report on what [SC]² can do for you.

SCIENTIFIC CONCRETE SERVICE CORPORATION
McLachlen Building, Washington, D. C.

Streamlined CRESCENT Scrapers



EXPLANATION OF PICTURE—

Two small Crescent Scrapers handle stockpiles covering ground on both sides of a conveyor running from mill to loading station at a dolomite processing plant.

The scraper in the foreground of the picture is stocking out screenings that are spouted onto the ground from the conveyor. This product is sold to the fertilizer trade with demand coming mainly in the Spring months. Upwards of 25,000 tons accumulates between seasons. The scraper piles up this surplus during nine months of the year and then works overtime in the Spring to reclaim the stored material.

The other scraper, which can be seen on the far side of the conveyor, has a different task. It stockpiles the overflow of dolomite when the crushers are producing more than the kilns can take care of and it reclaims from the pile whenever quarry or crusher operations are interrupted.

Haul Larger Loads at Lower Cost . . .

AT gravel and stone crushing plants, in strip mines and wherever there are problems of stockpiling or excavating, Sauerman Crescent scraper buckets are found daily demonstrating their ability to dig and deliver large tonnages at costs of a few cents per ton handled.

The secret of "Crescent" efficiency is in the streamline design of this unique bottomless bucket. A Crescent scraper penetrates hard materials with the ease of a plowshare, and requires less line-pull than any other type of scraper.

Moving back and forth at an average speed of 400 f.p.m., loading and dumping automatically, a Crescent Scraper, operated by a Sauerman improved hoist, is the most productive one-man machine for handling materials.

Write for Catalog

534 S. CLINTON ST. SAUERMAN BROS., Inc. CHICAGO 7, ILL.

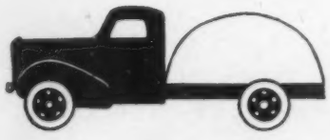
100% MORE PAYLOAD

ON YOUR OWN (or a new) 1½-2 ton MEDIUM TRUCK

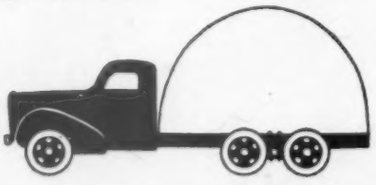
IDEAL EQUIPMENT FOR MINES AND QUARRIES

As heavy trucks become more and more scarce for hauling sand, gravel, rock, lime, cement, coal, logs, lumber, equipment, etc., you will do well to consider the THORNTON *Four-Rear-Wheel* DRIVE, which converts your used (or new) 1½-2 ton medium truck into a specially engineered six-wheel, heavy duty truck of unusual ability . . . capable of delivering 100% *more* rim pull, which permits 100% more payload through sand, mud, muck and up steeper grades. Thornton Drives for conversion readily available without priority. Write at once for full particulars.

Lime Spreading operators should investigate the improved performance of Thornton Drives with *Automatic-Locking* Differentials in both driving axles which delivers all the effective rim-pull so necessary in "open field" work.



3-4 TONS PAYLOAD
BEFORE CONVERSION



8-10 TONS PAYLOAD
AFTER CONVERSION

CHECK THESE FEATURES OF A TRUCK CONVERTED by THORNTON *Four-Rear-Wheel* DRIVE

- ✓ **Carry 100% more pay load**
- ✓ **Get 100% more tractive effort or rim-pull than the standard truck**
- ✓ **A Thornton engineered job out-pulls, out-lasts, out-maneuvers standard trucks costing double or more**
- ✓ **Two-speed gear case increases tractive effort or rim-pull more than 100% over the standard truck**
- ✓ **Save as high as 40% on the investment**
- ✓ **Save up to 30% on operating costs**
- ✓ **Save as much as 35% on upkeep expense**
- ✓ **Better springing and load flotation**
- ✓ **Six wheel brakes assure greater driving safety**
- ✓ **Save on tires . . . gasoline . . . oil . . . wages and time**

SEND TODAY FOR CATALOG and FULL DETAILS

THORNTON TANDEM CO.

8741-X GRINNELL AVENUE · PLaza 9700
DETROIT 13, MICHIGAN, U. S. A.

Investigate **THORNTON** *Automatic-Locking* **DIFFERENTIAL** for Replacement in Truck Axles

In Canada see: **H. V. WELLES, LTD.**, Windsor

Thornton Tandem Co.
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Please send me catalog of facts on changing my 1½-2 ton truck into a heavy duty truck.

Name_____

Address_____

City_____ **State**_____

Make of Truck_____ **Year**_____

Used for_____

The CONCRETE MANUFACTURER

NEARLY NEW CONCRETE BATCHING PLANT

Capacity 250-350 Cu. Yd. Per Hour . . . Available for Immediate Delivery.

Complete Butler concrete plant. Excellent condition, used only 7 months. Adaptable for either commercial or construction use where high rate of concrete pour may be required. Equipped for manual, semi-automatic or automatic operational control. See details below.

BATCHING BIN. Bin—250 yd. capacity—190 yd. 3-compartment aggregate 400 bbl. cement.

2 BUTLER CEMENT STORAGE BINS. 2,000 bbl. capacity, 2-compartment, 3,000 bbl. capacity, single compartment. All bins equipped with air jets and steam jets.

BATCHERS. 1 Butler aggregate 5 yd. capacity, complete with beam-type scale, manual operation.

1 Butler cement 3,000 lb. capacity, complete with beam-type scale, manual or automatic operation.

1 Butler water batcher 200 gals. capacity, beam-type scale, complete with 400 gal. surge tank and valves, manual or automatic operation.

ELEVATOR & TRACK SCREW. 300 bbl. per hour capacity, screw 37 ft. long, equipped for either box car or hopper car cement delivery. Complete with 20 hp. electric motor.

CONVEYORS. 1 Barber Greene 36" inclined conveyor 224'6" long, equipped with: 50 hp. Century motor; one 40 yd. track hopper; one 20 yd. track hopper; one 20 yd. truck hopper. All necessary A frames, trusses and supports included. All hoppers equipped with discharge gates.

1 Barber Greene 36" horizontal conveyor 129'6" long. Complete with 18 double clam-type fill valves, 20 hp. Century electric motor complete with trusses.

1 Barber Greene 36" inclined conveyor 60'6" long. Complete with 15 hp. electric motor, trusses and supports.

These conveyors were used only 6 months under cover. They are in excellent condition and include band type brake, pivoted distributor, ground level control and Alemite one-side system of lubrication. We have an extra 500 feet of brand new pre-war belting available with this plant or conveyor system.

MISCELLANEOUS. Collecting hopper under batcher, 5 feet cement screw feeder complete with motor for automatic control of cement. Traveling hopper for charging batch trucks. Extra cement buckets, drive chain, elevator chain for cement elevator and track screw, etc.

WE WILL CONSIDER THE SALE OF THIS EQUIPMENT IN UNIT SECTIONS AS FOLLOWS:

1. Concrete plant complete, including cement elevator, conveyor system, and one cement storage bin.
2. Concrete plant alone without cement storage bin or conveyor system.
3. Conveyor system alone.
4. Either or both cement storage bins with or without cement elevator and track screw feeder.

Also 13 Late Model Transit Mixers

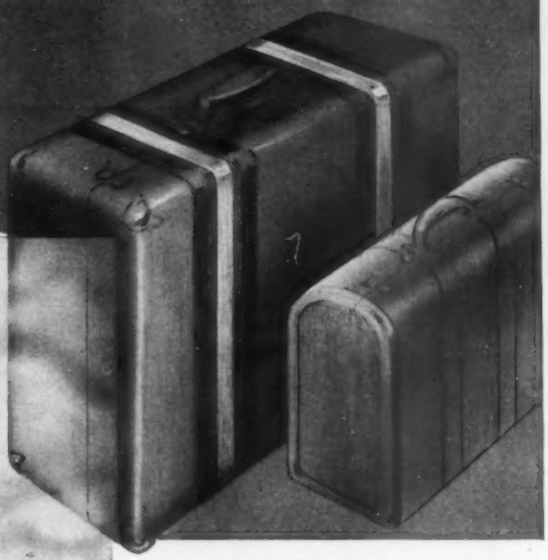
8—1942 Model Jaegers — High discharge, separate engine drive with two speed transmission: 4 mounted on 1942 Dodge trucks; 6 wheel tandem drive—all in excellent condition with good tires.

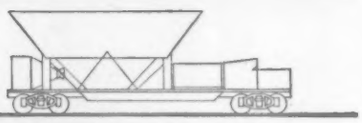
5—1942 Model Smith, all high discharge type with separate engine drive. Mounted as follows: 2—3½ yd. capacity on Mack trucks. 2—3½ yd. capacity on Autocar trucks. 1—4 yd. capacity on White truck.

MOTOR TRUCK SALES AND EQUIPMENT COMPANY

2435 COTTAGE GROVE AVENUE **Telephone: CALUMET 1255** **CHICAGO, ILLINOIS**

READY TO MOVE— *As A Suitcase!*





Shipped by FLAT CAR— *No Bin Disassembly*

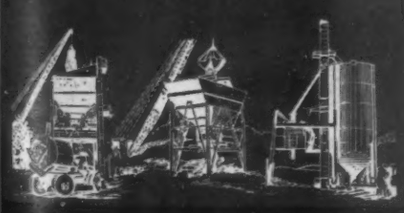
Equipment which can be readily moved from job to job without expensive disassembly is so desirable a feature that many contractors are willing to sacrifice capacity and convenience in order to obtain it. But here is a *full-size*, high capacity plant ready to move at a moment's notice, ready to go to work in a new location at a surprisingly short time. With 125 tons of bin storage, this plant batched three aggregates *and cement* to truck mixers at 120 cubic yards per hour consistently — a speed limited only by the capacity of the crane.

Butler ready mixed concrete plants, like all Butler equipment, is designed for *your* needs; let them serve you as they are serving builders around the world. Write today for Bulletin B-185.

Engineered BUTLER Design

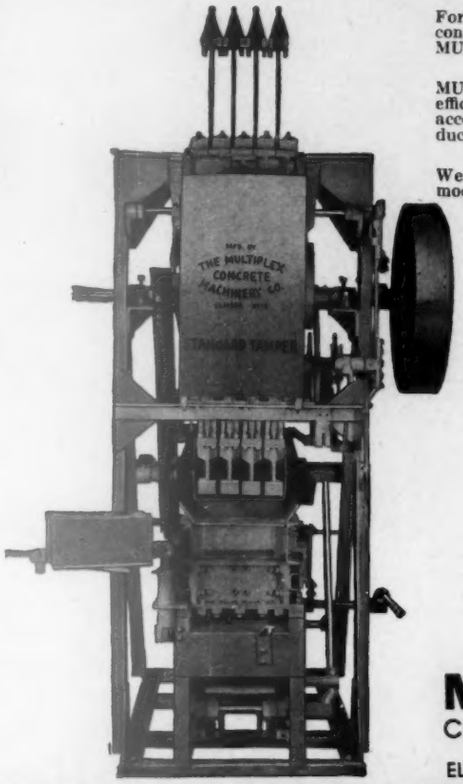
Not just bins and batchers, elevators and conveyors — but Engineered Design: That's the reason for the efficiency of Butler equipment. Ask about:

Ready mixed concrete plants
Central mixing plants
Portable batching plants
Bulk cement plants
Sand and gravel plants
Carscoop



BUTLER
BIN COMPANY
WAUKESHA, WISCONSIN

MULTIPLEX Machines ★ For Postwar Profits



For a Quick "Take-Off" and sustained pace in concrete block output, reserve one of the MULTIPLEX *high-speed* machines.

MULTIPLEX offers a wide variety of super-efficient mixing equipment, with all types of accessories necessary for economical mass production.

We can recommend MULTIPLEX units for modernizing *your* plant and enlarging its capacity.

★

Our universal type MULTIPLEX Standard Tamper for making plain and stripper, or face blocks, on one base. Easily convertible as business expands. Supplied with 4-bar or 8-bar tamper, either power or hand operated.

★

Write for Booklet describing the MULTIPLEX complete line of concrete mixing equipment, including Double and Single Hand Press Strippers, Power Press Strippers, and Super-Tampers.

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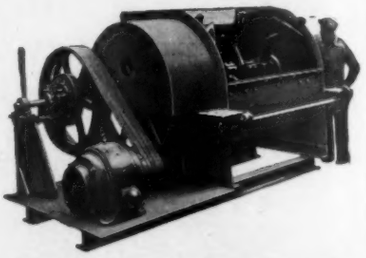
MULTIPLEX
CONCRETE MACHINERY CO.
Frank Muenzer, President
ELMORE • OHIO

The MULTIPLEX Flue Block Machine makes ventilated, solid or lightweight units, including all attachments for ventilator and stove pipe openings.



MULTIPLEX Multi-Mixer with reverse screw-type action insures fast and thorough mixing of every batch. Side, end or bottom discharge.

WHEN THE POST-WAR BOOM BREAKS.

Will you be able to supply the demand for sand and gravel—in great quantities and promptly? If there is any doubt about it, install Neff & Fry bins and elevator equipment so you can meet that increased demand. At least get your order on file for earliest possible installation.

Super-stave type.

Can be dismantled and re-erected should you have to shift your scene of operations. Get 1944 catalog.

THE NEFF & FRY COMPANY
CAMDEN, OHIO

N&F
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BINS

INDUSTRIAL So-Lo REPAIRS RUBBER

Prolongs Life of Conveyor Belts, Resurfaces Pulleys, Patches Rubber Boots, Gloves, etc.

Leading industries use INDUSTRIAL So-Lo. Quickly and efficiently patches and resurfaces breaks, repairs rips, burnt, and worn spots, and fills holes in industrial belting. Increases belt life and assures "lower belt cost per mile."

Used on all belts—rubber, rubber composition, leather, textile. Conserves war-vital materials!

MANY OTHER USES

Wide range of other uses. Resurfaces pulleys—metal, wood, composition. Repairs rubber boots and gloves. Makes metal or concrete stair treads slip-proof, lessening accidents. Also effective for insulating switch handles, foot grips, and other electrical devices.

JUST SPREAD ON— DRIES TOUGH OVERNIGHT

Easy to use. No special tools. Just spread it on to desired thickness—overnight it "air vulcanizes". Waterproof—acidproof—oil and grease resistant. Dries smooth and flexible—tough as rubber.

For full details, write AT ONCE to Dept. F5.

So-Lo WORKS, Inc.
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NAT-ALOY WIRE CLOTH

☒ VOTE **"YES"**

For this dependable, non-crystallizing, long-wearing Screen Cloth with "Nat-Aloy" Lock Crimp Meshes.

"IT'S THE PEOPLE'S CHOICE"

among profit-wise producers for precision separation and economical operation.

Stock shipments in all widths and all meshes. . . . Write for catalog No. 55.

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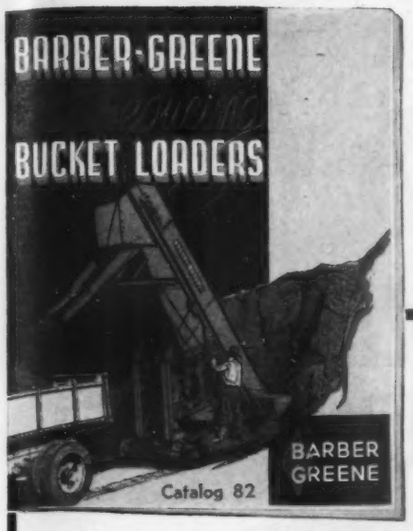

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Q-82

34 JOB PHOTOGRAPHS

The new Barber-Greene Bucket Loader Catalog 82 shows 34 photos of B-G Loaders saving time and money on different types of work including: truck loading from stock piles, road shoulder cleanup, top soil stripping, reclaiming, screening, loading scarified base, etc. Also specifications and accessories. Write for your copy.

BARBER GREENE
AURORA ILLINOIS

Millions of yards of Jaeger Truck-Mixed Concrete on major war work (exceeding the output of all other makes combined) prove the advantages of these motorized concrete plants. Nimble, flexible and fast, they speed placement, solve problem of extended or continuous pours.

THE JAEGER MACHINE CO.,
602 Dublin Avenue
Columbus, Ohio

Mixers—Pumps—Hoists
Paving Equipment

BARRETT LIFT-TRUCKS

ONE MAN HANDLES 48 BLOCKS NO BREAKAGE

Handle your green concrete products the way that more than 800 other concrete products plants do, WITH BARRETT LIFT-TRUCKS EQUIPPED WITH A SUPER-SPRING FRAME AND RUBBER TIRES. Eliminate breakage — joggling out of shape and spoilage. Save time, money and labor by eliminating all unnecessary handling and breakage. Take your blocks direct from the machine to the curing room—with ease and dispatch. One man handles 48 blocks of the 8x8x16 size—or, 32 blocks of the 8x12x16 size.
Write for illustrated circular.

BARRETT-CRAVENS COMPANY
3251 West 30th Street CHICAGO, ILL.
Representatives in all principal cities

ADD a Concrete Pipe Plant the UNIVERSAL WAY

We Can Equip You Now to Produce All Sizes Profitably

Operating 26 plants ourselves and making concrete pipe in all of them, we know what constitutes your best equipment. Ask us about our "all-purpose" machine which produces concrete pipe in every size from 6" to 48". We can also outfit you for making larger sizes — up to the 135" pipe we have made for highway work.

Write Today for Catalog and Details

UNIVERSAL
CONCRETE PIPE CO., Inc.
297 S. High Street
Columbus 15, Ohio

The CONCRETE MANUFACTURER

Memo for all products plants

"There is no better mixer than a STEARNS"

Stearns Mixers are designed and built for better, faster mixing—for extra long life—for lower operating and maintenance costs. *And that's what they deliver!*

Read the specifications.

SPECIFICATIONS: All welded heavy steel construction . . . drums equipped with wear-resisting *bar-type* liners that are easily and cheaply replaced . . . extra hard "Sterloy" ribbon type mixing blades . . . bag shelf and spill gate are just the right height . . . spill gate works smoothly, locks tight, won't leak . . . equipped throughout with dust protected ball bearings.

Available in 3, 12, 18, 28, 42 and 50 cu. ft. sizes—pulley, V-Belt or Gear-Head motor drive as desired.

We'd be glad to refer you to Stearns owners operating near you . . . Descriptive literature sent upon request.

STEARNS
MANUFACTURING CO. - ADRIAN, MICH.
GENE OLSEN, PRESIDENT

Designers and manufacturers of Vibration and Tamp Type block and brick machines . . . Mixers . . . Skip Loaders . . . Licensed under the basic Gelbman Vibration Patents.

Performance Speaks Louder than Words

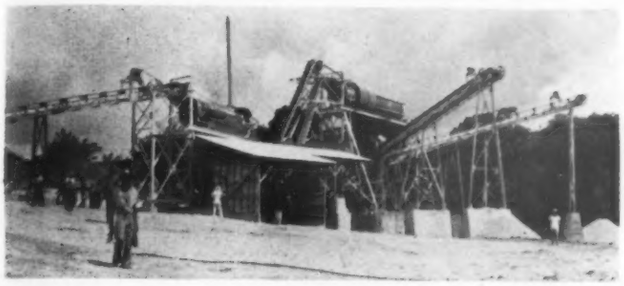
ASK any STEARNS owner

CLEVELAND BUILDERS SUPPLY CO.
Cleveland, Ohio
3 Stearns Mixers

ECONOMY BLOCK COMPANY
Wauwatosa, Wisc.
3 Stearns Mixers

GREAT LAKES CONCRETE PIPE CO.
Buffalo, N. Y.
1 Stearns Mixer

Don't Experiment in a Quarry!



This job takes **RELIANCE EQUIPMENT**

Rely on RELIANCE for Rock Crushers, Bucket Elevators, Revolving Screens, Wash Boxes, Feeders, Belt Conveyors, Air Separators, Hoists, Drag Lines, and other material handling equipment.

Write for Bulletin

Large-scale, profitable crushed rock production requires the right *tools* throughout — nothing "almost as good" will do!

That's why a fast-growing list of successful installations — like the above — are RELIANCE-Equipped "from top to toe!"

UNIVERSAL ROAD MACHINERY CO.

KINGSTON, NEW YORK

Distributors in all principal cities of the U. S. A.

BLAW-KNOX BUCKETS

Write Headquarters for the Catalog You Need

No. 1586—Blaw-Knox Concrete Buckets.

No. 1606—Blaw-Knox Buckets for Contractors.

No. 1696—Blaw-Knox Buckets for Single Drum Hoists for use on Railroads. Mills, Foundries, Etc.

No. 1745—Blaw-Knox Buckets for "Burtoning" handling Nitrates, Grain, Potash, Etc.

No. 1757—Blaw-Knox 2 Line Lever Arm Buckets for Rehandling, Barge Cleanup, General Purpose, Hard Digging, Dredging.

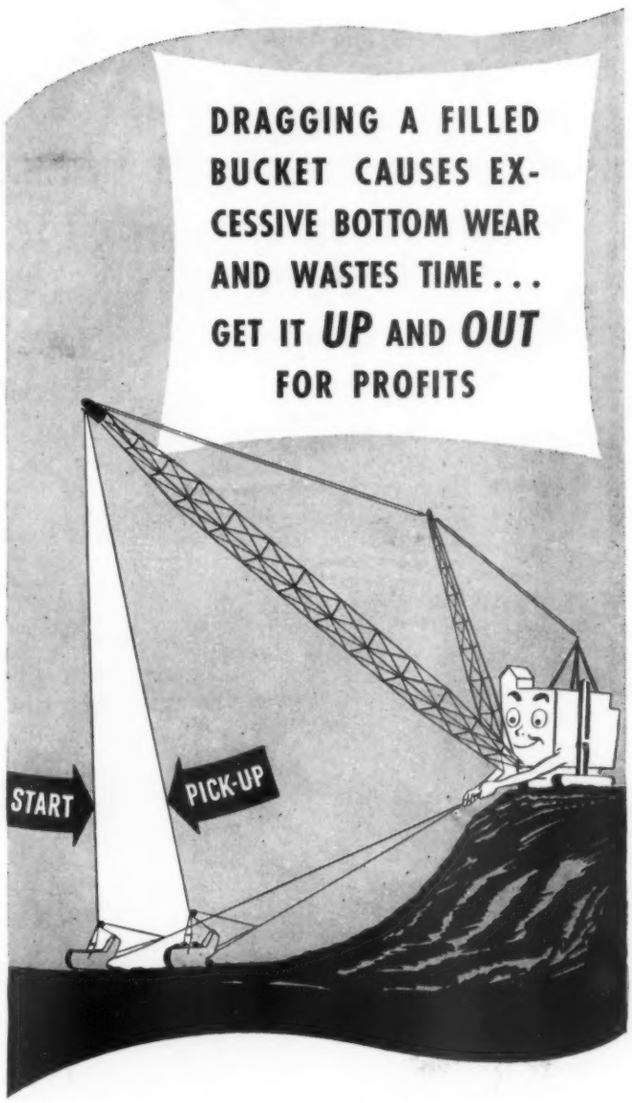
No. 1865—Blaw-Knox 4 Rope Buckets for Coal, Ore and Cleanup.

BLAW-KNOX DIVISION of Blaw-Knox Company

2004 Farmers' Bank Bldg., Pittsburgh, Pa.

DRAGLINE PRODUCTION TIP NO. 2

PICK UP THE BUCKET AS SOON AS LOADED!



Within 1 or 2 bucket lengths, a Page AUTOMATIC Dragline Bucket *digs, fills* and *carries* a full pay load. Size for size and weight for weight a Page AUTOMATIC will OUT-DIG any other dragline bucket made!

PAGE *Automatic* DRAGLINE BUCKETS

PAGE ENGINEERING COMPANY, CHICAGO 38, ILL.

L-R COUPLINGS ESPECIALLY DESIGNED FOR PIT AND QUARRY POWER

L-R Type "H" illustrated, the latest most modern coupling for 4.60 to 806 h.p. Other couplings to 2500 h.p. Noiseless. Positive absorption of shock and vibration. Greater torsional flexibility. Never need lubrication. Friction-free due to L-R principle of free-floating load cushions hung between rugged steel jaws. Cushions always in sight. No shut-downs for changing.

L-R Type "H"
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L-R FLEXIBLE COUPLINGS

QUICK-FINDING SELECTOR CHARTS COME FREE WITH COMPLETE L-R CATALOG . . .

There's an L-R coupling for every service duty and condition inside or outside your plant. Correct misalignment, endwise displacement, whip, backlash, chatter—*save your equipment and prevent production delays* with the insurance of L-R performance.

WRITE OR WIRE.

LOVEJOY FLEXIBLE COUPLING COMPANY

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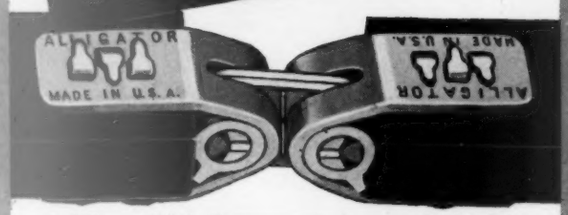
Now you can fasten V-belts by using

ALLIGATOR V-BELT FASTENERS



● Alligator V-belt Fasteners and the open-end V-belting now being made by belting manufacturers, will enable you to make up multiple V-belt drives from roll belting. These fasteners have been on the market 9 years and are now being used on a wide variety of drives.

Available for B, C, D sizes of belt for industrial use and 1-in. and 2-in. sizes for railroad use. These fasteners, however, should not be used for repairing endless cord V-belts.

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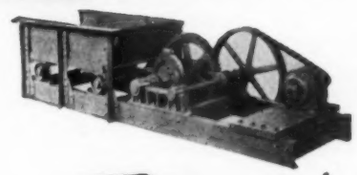

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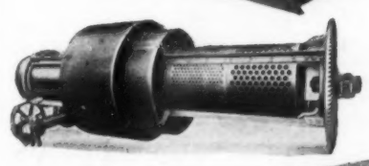

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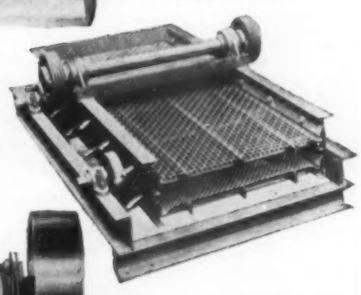

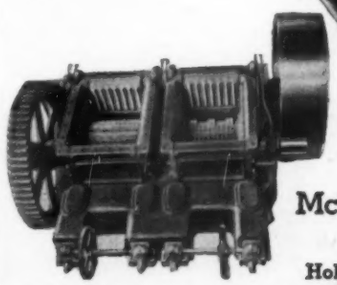

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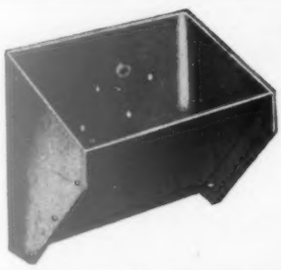

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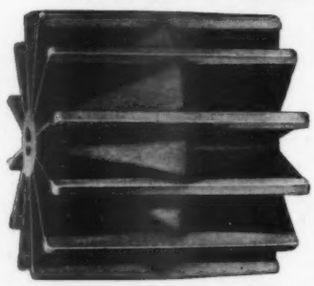

with less cost.

The exclusive wing and cone design of the Belt Saver Pulley prevents materials being trapped between the belt and the pulley face, abrasive action and belt puncture are reduced to a minimum. Users report 50% to 75% greater belt service, with minimum loss of operating time.

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Violent vibration for fast, positive separation *all* over the screen—controlled by accurately balanced design for smooth action. Long life, low maintenance costs. No choking. Fast delivery. 11 Sizes in 1-2-2½-3-4 Decks. Tell us your needs. Write for Bulletin D42V.

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COLUMBUS material handling equipment—from a single bucket to a complete plant—insures maximum value for durability, low cost operation and maintenance.

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Fire Clays, Coal, Limestone
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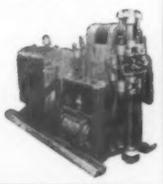

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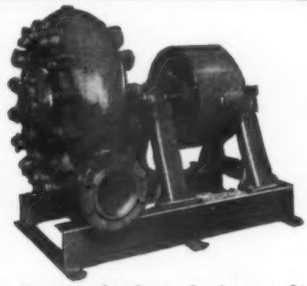
Sand and Gravel Pumps
HEAVY-DUTY
(Ball-Bearing)
and Low Head Types



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GODFREY LOADER 24' CENTERS
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10' dia. bowl with 2'3"x19'8" rake.
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15' dia. bowl with 2'3"x23' rake.

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Trays and Superstructures for 30' dia. x 10'; 30' dia. x 12'; 40' dia. x 12'.

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2—6'x6'
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1—4'x20' Class B-2
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Each of these dryers is equipped with combustion chamber, oil burner, exhauster, driving motors, etc.

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Each with direct connected motor, starting equipment, cyclone collector, tubular dust collector and all interconnecting piping.

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14"x8"
7¼"x4"
5¼"x4"

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1—20' and 2—25' c/c.

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Packers, Fuel Oil Pumps, Magnetic Separator, Portable Drills, Electric Grinder, etc.

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Conveyor Belting...Transmission Belting...Elevator Belting...Fire, Water, Air, Steam, Suction or Welding Hose, etc.

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CONVEYOR BELTING

ABRASIVE RESISTANT COVERS

Width	Ply	Top-Bottom	Covers	Width	Ply	Top-Bottom	Covers
48"	8	1/8"	1/16"	20"	5	1/8"	1/32"
42"	5	1/8"	1/16"	20"	4	1/8"	1/32"
36"	6	1/8"	1/16"	18"	4	1/8"	1/32"
30"	6	1/8"	1/16"	16"	4	1/8"	1/32"
30"	5	1/8"	1/16"	14"	4	1/16"	1/32"
24"	5	1/8"	1/32"	12"	4	1/16"	1/32"
24"	4	1/8"	1/32"				

Inquire For Prices - Mention Size and Lengths

TRANSMISSION BELTING

HEAVY-DUTY FRICTION SURFACE

Width	Ply	Width	Ply	Width	Ply
18"	6	10"	6	6"	5
16"	6	10"	5	5"	5
14"	6	8"	6	4"	5
12"	6	8"	5	4"	4
12"	5	6"	6	3"	4

Inquire For Prices - Mention Size and Lengths

ENDLESS "V" BELTS

"A" WIDTH All Sizes | "D" WIDTH All Sizes
"B" WIDTH All Sizes | "E" WIDTH All Sizes
"C" WIDTH All Sizes | Sold in Matched Sets

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FIRE HOSE

APPROVED SPECIFICATION HOSE
EACH LENGTH WITH COUPLINGS ATTACHED

Size	Length	Per Length
2½"	50 feet	$28.00
	25 "	16.00
2"	50 "	23.00
	25 "	13.00
1½"	50 "	20.00
	25 "	11.00

Specify Thread On Couplings

SPECIAL OFFER . . . HEAVY DUTY
RUBBER HOSE

WATER HOSE
Each Length with Couplings Attached

I.D. Size	Length	Per Length
¾"	25 feet	$4.25
1"	50 "	8.00
	25 "	6.25
1¼"	50 "	12.00
	25 "	7.50
	35 "	10.50
	40 "	12.00
1½"	50 "	15.00
	25 "	10.00
	35 "	14.00
	50 "	20.00

AIR HOSE

I.D. Size	Length	per Length	Couplings
½"	25 feet	$5.00	$1.50 Pair
	50 "	10.00	1.50 "
¾"	25 "	6.25	2.50 "
	50 "	12.50	2.50 "
1"	25 "	10.00	3.50 "
	50 "	20.00	3.50 "

LARGER SIZES ALSO AVAILABLE
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526 CFM Ingersoll-Rand, Style "JC"

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"*Anything* containing IRON or STEEL"

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10—36" ga. **WESTERN** 5 yd. dump cars.

10—Std. ga. **WESTERN** 12 yard dump cars, all steel, hand dumps.

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2—Model 25A **KALAMAZOO** motor section cars, 4 cy. gasoline motor.

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Farrel 36" x 15" B Jaw Crusher, complete with Motor and Drive. Motor 60 H.P. Slip Ring, 220 V., 3 ph., 60 C. Drive V-Flat with Ropes.

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Bucyrus-Erie, Steam, Model 225B, boom 85′, stick 54′, dipper 6 yd. Very attractive price.

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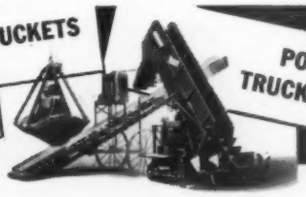
PORTABLE CONVEYORS
PORTABLE TRUCK LOADERS



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AIR COMPRESSOR — I. R. Duplex, 100 HP. motor and receiver.
STEEL GUY DERRICK—110′ mast 90′ boom —3 drum Clyde hoist, electric.

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1—**P&H 1 YD. SHOVEL**, Gasoline, Reconditioned.
1—**MARION** 32 Steam, 1½ Yard Shovel.
1—**LOCOMOTIVE**, 4-wheel, 10 ton, 25′ boom, Brown Hoisting Co.

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BUCKET ELEVATORS—Several sizes.

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1—No. 40 I. R. Drill sharpener.

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1—3½ x 44 ft.
1—7′ x 56′, and others.

FEEDERS

2—**BAILEY FEEDERS**, Type No. 2, complete with steel hoppers, 8½ ft. dia. x 12 ft. cone bottom.

GRINDING EQUIPMENT

1—**CRUSHER**, Kennedy No. 14 Gyratory.
1—**TUBE MILL**, 5½′ x 20′, F. L. Smidth Co.
1—**TUBE MILL**, 5½′ x 22′.
1—**TUBE OR BALL MILL**, 5′ x 10′.
2—**RAYMOND MILLS**, 4 rolls.

KILNS

Vulcan 7′ x 120′, like new. And other sizes.

SCREENS

4—**SINGLE DECK HUMMER SCREENS**, 4′ x 5′ complete with feeder and generator.
2—**SINGLE DECK HUMMER SCREENS**, 4′ x 5′.
1—**TRIPLE DECK KENNEDY SCREEN.**

SYNCHRONOUS MOTORS

1—1900 HP. 25 cycle, 2300 V.
2—1250 HP. 25 cycle, 2300 V.

WANTED

DIESEL AND GENERATING EQUIPMENT
CEMENT MANUFACTURING EQUIPMENT

WEBBER EQUIPMENT CO.
New and Used Equipment
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LOCOMOTIVE CRANES

4—25 Ton Loco. Cranes, Browning & Industrial, oil fired, 40′, 45′ & 50′ booms.
1—15 ton Bucyrus Erie, coal fired, 40′ boom.

AIR COMPRESSORS

Portable and stationary, belt with elec. or gas power, sizes from 20 cu. ft. to 1,000 cu. ft.

CRANES AND SHOVELS

1—1¼ yd. Erie gas air Model GA2, Serial No. 9758, with 45′ boom and shovel attachment.
1—1¼ yd. P & H, Model 650, Serial No. 4173, with 55′ boom & shovel attach.
1—1 yd. P & H, Model 600, Serial No. 3502, 40′ boom, and backhoe attach.
1—¾ yd. Conco crane, Serial No. 1304, fully revolving, power 70 H.P. Continental gas engine, 30′ boom.
1—¾ yd. Koehring crane, Model 301, with 45′ boom, Serial No. 772. Gasoline powered.
1—¾ yd. P & H Model 400 crawler crane, Serial No. 4136, with 40′ boom gasoline powered.
1—½ yd. P & H shovel Model No. 204, Serial No. 2303, gasoline powered.
1—½ yd. Northwest No. 2, Serial No. 2908, comb. crane and shovel.
1—¾ yd. Erie Model B2 crawler crane, steam powered. Serial No. 4027, with 50′ boom and shovel attachment.

CRUSHERS

1—9x12″ Rogers jaw crusher, (like new).
1—No. 4 Champion jaw crusher, size 9x15″, Serial No. 2606.
1—No. 2 Climax jaw crusher, size 9x16″.
1—Buchanan jaw crusher, size 10x16″.
1—Acme jaw crusher, Ser. No. 1873, size 12x20″.
1—Acme jaw crusher, Ser. No. 1686, size 9x16″.
1—United Iron Works "Blake-type" jaw crusher, size 9½x24″.

The successful contractor like the successful general keeps his operations as thoroughly mechanized as possible. But contractors can keep equipment investment low. They can *rent* or buy from Equipment Corporation.

1—Allis Chalmers, No. 5 gyratory crusher, Ser. No. 5331, opening 10x38″.
1—Austin No. 5 gyratory crusher, Ser. No. 2945, opening 12x35½″.

DERRICKS

3—Steel Guy Derricks; 1—20 ton American steel derrick, 110′ mast, 100′ boom; 1—5 ton Terry Guy Derrick, 70′ mast, 60′ boom; 1—5-ton Insley, 75′ mast, 80′ boom. Stiff leg derricks; 1—25 ton Hunter, 40′ mast, 80′ boom; 1—2 ton Pittsburgh, 26′ boom, 15′ mast. Also a number of wood stiff leg derricks, 1 to 5-ton cap.

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85—Electric, ranging from 20 H.P. up to 125 H.P., consisting of triple-drum, double-drum and single-drum, with AC or DC motors, some with attached swingers. Following makes American, Clyde, Lambert, Lidgerwood and National.

Gas hoists ranging from 8 to 120 H.P., single, double and triple-drums; all standard makes (38 in stock).

Steam, ranging from 8 H.P. to 60 H.P., single, double and triple-drum; all standard makes.

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1—8″ Cataract dredging pump, Ser. No. 175895, cap. 2000 GPM @ 53′ head.
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A large quantity of Jack hammer drills, column tripod and derrick drills.

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DEPENDABLE USED MACHINES
Northwest No. 3 dragline
Thew 1 yd. gas rock shovel
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Troughing rolls, all sizes
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FOR SALE
2—Traylor 12″ Gyratory Crushers
28—1¼ Side Dump Roller Bearing, 36″ gage cars
3—Rex 27E Pavers
Conway Mucking Machines
4 and 8 ton Battery Locomotives
WENZEL & HENOCH CONSTRUCTION COMPANY
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13 —— Transit Mixers — Nearly New —— 13

8—1942 Model Jaegers—High discharge, separate engine drive with two-speed transmission. 4 mounted on 1942 Dodge six wheelers tandem drive, good rubber, excellent condition.

5—1942 Model Smiths — High discharge type. These mixers were used only six months, and are mounted as follows:
2-3½ yd. capacity on Mack trucks.
2-3½ yd. capacity on Autocar trucks.
1-4 yd. capacity on White truck.
All single axle drive in good condition, with good rubber.

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LOCOMOTIVES SHOVELS - - - CRANES CARS

1—65 ton American 0-6-0 standard gauge separate tender switcher, 20x26" cylinders, ASME boiler, ICC papers.

1—50 ton Porter 0-4-0 standard gauge saddle tank switcher, National Board and Ohio standard boiler. Built 1928.

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1—72½ ton Baldwin 0-6-0 standard gauge separate tender switcher, 20x26" cylinders. Full time ICC papers.

The above locomotives are now being rebuilt for prompt delivery.

1—40 ft. steel underframe flat car, 50 ton.

1—60 ft. steel underframe flat car, 40 ton.

1—2 yard Hayward rehandling 2 line clamshell bucket, completely overhauled.

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FOR SALE

1—Byers ⅝ yd. Comb. Dragline & Clam with Buckets. Excellent condition.

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1—Johnson 40 yd. 2 comp. Bin with or without batch scales.

1—Page 2 yd. dragline bucket.

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Model M Northwest Dragline with 1½ Yd Page Bucket
60A Lorain 1 Yd Shovel & Crane Gas
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3—8 Yd Koehring Gas Rubber Tired Scrapers
3—10 Yd Gas Bot Dump Rubber Tired Euclids
1½ Yd Sauerman Elec Slackline Complete
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3 Deck 4' x 6' Diester Vib Screen Complete
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4" x 40" A-W Roller Bearing Jaw Crusher

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1—3 Drum Byers Hoist & Swinger with Hoist
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1—1 Yd. Marion Steam Shovel
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2—6x22 Ft. Tube Mills
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1—2000 KW Turbo Generator, 3/30/480

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SHOVELS—CRANES

Buc.-Erie 50B, 2 yd. Stripping Shovel, steam
Link Belt K42 Crane and Dragline, Gas
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Ind. Brownhoist 10 ton cap. Crane, gas, 40' bm.
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Marion 37, 1¾ yard Steam Shovel
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Bay City ½ yard Shovel, gas
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Kennedy-Van Saun Revolving Screen 4' x 18'.
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⅝ yd. Williams Clamshell, digging
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Erie ¾ yd. Clamshell, rehandling
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Caterpillar D6 with bulldozer
Allis Chalmers LO with bulldozer, rebuilt
2 Cletrac FD Tractors with bulldozers
Heil 12 yard Scraper
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Gyratory Crushers: K.V.S. 30, 37-S, 49; Traylor 8"; McCully 13", 8", 6"
Jaw: 10x22, 10x24, 11x18, 12x24", 14x24", 16x32
Complete Rock Crushing Sand & Gravel Plants

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American 60 ton, steam, std. ga.
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Whitcomb 14 ton, Diesel, 36" gauge
Porter 13 ton, Steam Saddle Tank, 36" gauge
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Baldwin Westinghouse 8 ton, 36" ga. Battery
Vulcan 8 ton std. gauge, gas
Vulcan 6 ton, 36" gauge, gas
3—Western Steel 20 yard Air Dump Cars
3—30 ton Standard Gauge Flat Cars, rebuilt

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2—Ransome 288 Mixers on skids, left and right hand
Blaw-Knox 750 bbl. 2 compt. Cement Bin
Heltzel 85 ton, 3 compt. Steel Bin, weigh batcher
Heltzel 100 ton, 3 compt. Aggregate Bin with 250 bbl. Bulk Cement Bin, with electrical interlocking

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Lot parts for Model 76 Shovels.
1—Barber Greene Loader, Model 62,-220 volts.
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1—50 ton Heisler Steam Loco. Std. Ga.
Bucyrus Erie Car Transporter, 165', 5 yd. 220 volts. (Stacker).
170' 22" Belt Conveyor, troughed.
#4 Gates Gry. Rock Crusher.
24 x 24" Jaw Crusher.
22 ton Howe Truck Scale, 24 ft.
15—10 yd. Steel Side Dump Cars, std. ga. Heavy duty, roller brg.; A1 condition.
7 ton Plymouth Gas Locomotive, 36" ga.
12 ton Porter Diesel Loco; 36" ga.
12' x 12' Incline Holding Drum & Structure.
Drag line Boom 45' & Bucket for 37 Marion.

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1—Model 8 Northwest dragline-crane. 65' boom. Will handle 1½ yard drag bucket. Twin City gas engine. Rebuilt. Pennsylvania location.

1—Model 1500 Speedcrane dragline-crane. 1¼ yard dragline bucket. Hercules gas engine. Rebuilt. Pennsylvania location.

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ABRASION RESISTING STEEL

½" Steel Plates . . . 3½% Nickel Steel

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. . . RANDOM SIZES . . . 30" to 56" WIDE . . .

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Jaw Crushers—4"x8" up to 18"x36".
Crushing Rolls—16"x10" up to 54"x24".
Gyratory Crushers—No. 3, No. 12.
Ring Roll Mills—No. 0, No. 1, and No. 2.
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Direct Heat Rotary Dryers—3½'x25', 4'x30', 5½'x40', 6'x50', 7'x50'.
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2 heavy, C. I. pulleys, 84" x 23".
New Dryers built for all purposes.

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BUCYRUS ERIE 50-B STEAM SHOVEL. GOOD RUNNING CONDITION.

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IMMEDIATE DELIVERY

½ Ton, 1 Ton & 2 Ton Asphalt Plants.
50 KW Cummins 3/60/120/208 V. Diesel Generator.
No. 4B Ross 24" Chain Feeder.
1¼ yd. 41 B B.E. Shovel Front.
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1 Ton Lancaster Asphalt Pug Mill.
750 GPM Worthington 220' Head Pump.
4/6 Ton Goodman 36" Ga. Trolley Battery Locomotive.
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Apron Feeders

1—48" x 12', 3—30" x 5'6".
3—24" x 60".

Screens

1—5 x 12, D.D & 2—3 x 8 S.D.

Crushers

36 x 30 Diamond Roll.
16 B Telsmith Primary.
2—30 x 18 Double Roll.

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211' 36", 410' 36", 175' 36".
182' 18", 186' 20", 128' 24".
140' 24", 202' 30", 210' 36".
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35 Ton McMyler Crane
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120 Ton Locomotive 0-8-0
50 to 75 Ton Stiff leg Derrick
25 Ton Gantry Crane, All Elec.

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½ yd. Bear Cat
½ yd. Universal
½ yd. Bay City
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¾ yd. Northwest Crane-Shovel-Backhoe
⅜ yd. ¾ Swing Bay City Shovel
⅜ yd. ¾ Swing Insley Crane
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½ yd. Osgood Crane
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Allis-Chalmers L with B/D "70"
Caterpillar "50" Diesel
TD-35 International

MISCELLANEOUS

Car-Twin Hopper S.G. 50 Ton
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2½ yd. Hayward Rehandler Clam. Bucket
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3—HEAVY DUTY 2000 LB. ASPHALT MIXERS.
8—ROTARY KILNS; 7 ft. diameter by 60 ft.
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1—HARDINGE MILL: 8' dia. x 22", girth gear and pinion.
1—ALLIS-CHALMERS DRY MILL; 4' 6" x 20', M. D.
1—AMERICAN HOIST & DERRICK CO. DRUM HOIST; No. 740, arr. for M. D., 40 HP motor.
1—DEVINE ROTARY VACUUM DRYER; 5' x 30'.

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1 Crushing Roll, Garfield Type, 54" x 20".
2 Sets Manganese Roll Shells—54" x 20"—New.
1 Lippman Scrubber Screen—72" x 18'—Complete with G.E. 20 HP motor 440 volt with starter.
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First Class Condition—Priced for quick sale!

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ROCK CRUSHING PLANT

2-unit outfit, primary unit consisting of 15x38" Roller Bearing crusher, 36" apron feeder, grizzly, conveyor delivering to secondary unit consisting of 42x24" Roller bearing rolls, 36x10' 2-deck vibrating screen, sand rejector, side delivery conveyor, all mtd. on Solid Rbr. tired wheels. Add'l 18" x 40' conveyor with LeRoi motor delivering to 21-yd. bin included. Completely overhauled in our shop; with or without 140 hp Wisconsin motor.

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GASOLINE LOCOMOTIVE

1—20 ton Vulcan standard gauge, 4 wheel, gasoline locomotive, serial No. 3776, thoroughly overhauled.

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60 ft. Crane Boom
1-yd. Blaw-Knox clamshell bucket
1-yd. Osgood Shovel front.
8800 Caterpillar Diesel engine
22 x 26", 2 roll coal crusher
12-Ton, 36" gauge Porter diesel locomotive

ACME EQUIPMENT COMPANY

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Frigid lowering device and grave lining. Good condition.

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Decatur, Illinois

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PUMPS: 3"-18"—Bronze, bronze-fitted and ironcased

SECTIONAL SCREW CONVEYORS—with and without steel case, 12-14-16-18-20 inches

STEEL HOPPER BINS—from 230 cu. ft. to 35,000 cu. ft.

GRINDING BALLS—¾" to 4"

SHAFTING AND HANGERS—2-7/16" to 6"

BUCKET ELEVATORS, STEEL ENCASED—various sizes

Specially Priced

ALLIS CHALMERS COMPEB MILL No. 8745, dry grinding 45' long. A four compartment mill, first one 10' long and 8' diameter. The other compartments taper to 7'. The mill has chilled iron liners, 36" table feeder, 72" Cutler Hammer Magnetic clutch and three compartment dust collector.

Smidth tube mill 5'6" x 22."

Krupp Ball Mill No. 8

SCREENS

6—3 x 5 Hummer Screens w. 2 MG sets

PULVERIZERS

30" Griffin Mills

42" Fuller Lehigh

30" x 24" Jeffrey Swing Hammer Pulverizer—Type A

FULLER-KINYON PUMPS

8" and 4"

Three and two way Fuller-Kinyon valves

Buell Dust Collector

ALL STEEL 20 ton stiff-legged derrick, 60' boom with 900' ⅝" steel cable

LOCOMOTIVES

20 ton G. E. Pantograph standard gauge, 500 V. DC

8 ton Vulcan, standard gauge, gasoline

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All types and sizes

KILNS

VULCAN IRON WORKS STEEL ROTARY:

3—8'6" x 7'6" diameter

1—7'6" x 7' diameter

All 125' long

SPEED REDUCERS

6—Jones Herringbone 50 HP ratio 93.5 to 1

DRYERS

9—5'6" x 5' diameter

1—6' x 5' diameter—up to 60' long

1—Ruggles Coles double shell 5' diameter 30' long

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McCully Gyratory Style K No. 10 and No. 6

Gates-Gyratory No. 6 and No. 5

HEAT and POWER Company, Inc.

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Jaw crushers: 9x16, two 11x20", 18"x32"
Traylor 11" "BULLDOG" gyratory crusher
Robins double roll spiked coal crusher, 24"x30"
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Single roll coal crusher with spikes, 24"x24"
Simplex roller bearing coal pulverizer
American Standard Disintegrator 24"x18"x30"
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Williams No. 2 hammer mill
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Buchanan 16"x10" steel jaw crusher

CONVEYORS

36"x175" trough belt conveyor with belt
Selected belt idlers and pulleys
400' of 6 ply 36" conveyor belt
300' of 6 ply 14" conveyor belt
86' new stepped 54" conveyor belt
Single strand flight conveyors, 11" and 15"
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Jeffrey Standard Steel Apron Feeder, 24"x60'
Three Robins Automatic 14" belt trippers
Hand propelled trippers for 24" and 30" belt

BUCKET ELEVATORS

Enclosed 14"x16" bucket elevator up to 120'
Enclosed 12" bucket belt elevator up to 90"
Enclosed 8" bucket elevator, 55'
Enclosed 6" bucket belt elevator, 32'
Open 16" bucket-chain elevator, 50'
Open 18" bucket-belt elevator, 40'
Open 20" bucket-belt elevator, 52'
Continuous 14" bucket elevator, 50'
Continuous 30" bucket elevator, 35'
New 9 ply rubber cover elevator belt, 22"
Used 6 ply 20" wide elevator belt
Gears, sprockets, elevator and drive chain
2000' of C102½ chain with K2 attachments

MISCELLANEOUS

C-P air compressor, 529' 100 hp motor
Schramm air compressor, 360' 60 hp motor
I-R. air compressor 275', Gasoline
Two Meyers Stone saws, 60" and 48" dia.
Lincoln 42" open side planer, 7½ hp motor
Lincoln 36" open side planer, 7½ hp motor
Patch 36" belt driven planer, 12' bed
Meyers 60" carborundum saw, motorized
Meyers 48" carborundum saw, motorized
Mang. lined 6" sand pump, 75 hp motor
Worthington 4" centr. pump, 25 hp motor
Electric, gasoline and belt driven pumps
Whitcomb 36" gauge 8 ton gasoline locomotive
Mercury 1½ ton 30" battery locomotive
Sprague Electric 6 ton car puller
Cargo type car puller, 15 hp 440 volts
V shape 36" gauge 2 yard end dump car
Flat cars for 20" and 24" gauge
Turntables 48" dia., cast, ball bearing
Eight enclosed 25 hp angle drive. NEW
54' of 16" screw conveyor, U troughs

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JIGGER triple deck 2'x5' vibrating screen
Hummer vibrating screens, 3x5' and 4x5'
Tylers 15 cycle generators for Hummer screen
New "TONCAP" cloth, framed, 3x5 and 4x5
Revolving screens, 42"x18', 4'x16', 5'x20'

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15-ton Industrial-"Brownhoist" Gasoline Locomotive Crane.
17½-ton Industrial Steam Locomotive Crane.
30-ton Whitcomb Gasoline standard-gage Locomotive.
30-ton "Browning," steam Locomotive Crane.
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Standard gage Nordberg track-shifter.
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P&H 600 crawler gas combination shovel, crane, and dragline, 1 yard. Excellent condition.

Barber-Greene Model 25-A crawler gas disc type bucket loader. Excellent condition.

Prices below Government regulations.

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NATIONAL 10-ton single drum winch, arranged for direct motor drive.

CALDWELL Car Puller, arranged for direct motor drive.

60 HP **WESTINGHOUSE** type SK motor, 230 volts, DC, speed 680 RPM's, with Morse silent chain drive and sprockets.

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75—Used Steel-Brooks Load Lugger Buckets; 1½ yds. capacity. V shaped bottoms—rounded, with ring hooks.

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Barber-Greene 25 Gas Cat. Bucket Loader.
2 Yd. Gas Cat. Drag.-Crane; 1½ yd. Electric.
Electric Cat. Shovels—1¾-2-3-4 yds.
Shovel Front Parts & misc. for P&H 206.
Bulldozers—Angledozers—Tractors, Diesel & Gas, inc. TD-40, TD-14, Cat. 30-50-60.
Front-End Loader, Cat. crane ½ yd., ⅜ rev.
Loco. Cranes—15-22½-27½ ton, Gas-Diesel-stm.
850 KW Uniflow Gen. Unit, 3-60-220, 200 lbs.
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One fourteen (14) inch hydraulic pumping system, complete with pressure and sludge pumps — details on inquiry.

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13" x 36" Stevenson Single Roll Crusher.
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Motor Truck Scales.....$440.00
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New—Immediate Delivery
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1—No. 3 Traylor breaker crusher, want to move.
1—8" and 1—6" centrifugal pump.

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One No. 2 Kuntz Feeder—Raw Lime or Stone
One No. 2½ yard side Dump car—90% new

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1 ton or 2 ton Asphalt Plant
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2 or 2½ or 3 yard stripping shovel, Diesel or Electric, long reach, must be first class condition. Preferably located in Ohio or vicinity. D-7 Caterpillar Tractor with bulldozer or angledozer. First class condition or rebuilt and guaranteed.

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Wanted — the Right Man!

Manager for quarry and lime plant in attractive small town in northern New York on Lake Champlain. Position permanent, unaffected by war conditions. Plant has unusually fine possibilities. An opportunity limited only by personal ability of applicant. Desirable location for family man; excellent school. Give full details: experience, salary, etc.; confidential. Write Box No. 530, Pit and Quarry, 538 S. Clark St., Chicago 5, Illinois.

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Allis-Chalmers Anaconda Type XX Crushing Rolls, size 72"x24" with new spares.
ALSO, 54"x20" & 42"x16" type "B".
Marcy BALLMILL. 8'-00x6' with new spares.
Two Allis-Chalmers type K gyratory Crushers No. 21.
One No. 10, and one No. 5 same type.
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One Slugger Mill 36"x48". Same as new.
Two Com-peb Mill with 400 HP motors. NEW.
One 36 inch Worthington centrifugal pump. Capacity 34,000 GPM. Very little used.
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No. 2 Sturtevant Open Door Rotary Fine Crusher
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6x20 Sturtevant Roll Jaw Fine Crusher
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1—16 x 16 Cedar Rapids Roll Crusher, complete.
1—20 H.P. Electric Motor. One Starting Switch and Belt for same. Ready for use.

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CRAWLER CRANES

1 yd. McMyler, 50' boom
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4 3½ cu. yd. Rex Mixers, 1939 Horizontal
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Base and shell for 10" Morris Pump
4 Drum Hoist for Sand Dredge
6" Morris Centrifugal Pump and 220 Volt Motor
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2 ¾ yd. Williams Buckets
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16'x16' 500 bbl. Bulk Cement Bin with legs, Bucket Elevator and 16 sack Johnson weighing Batcher
2 Cement Screws and Housings

All above equipment available for inspection at our yards.

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2—30" Shaw Sand Classifiers with 32' of ¼" steel flume and steel support frame for all. Practically new. Will trade for 2—96" or larger dewatering cones or equivalent.

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Factory Rebuilt. New smooth roll shells. Star Gear Drive. Countershaft. Guaranteed. Immediate Shipment.

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1—Full Revolving Winther Truck Crane. 32 ft. Boom, mounted on Winther 3-ton Truck. Solid Tires. $2450.00
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50—50 TON COMPOSITE GONDOLA CARS BUILT NEW IN 1928

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1—5' Dia. x 4' Ball Mill
1—1 yd. Williams Orange Peel Bucket
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1—37 H.P. 48 x 42 8D National Hoist
3—35 H.P. National DD Tugger Hoists
2—45 H.P. Ingersoll-Rand Tugger Hoists
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5—4" Dorrco Diaphragm Suction Pumps
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1—5' x 7' Robins Eliptex Single Deck Screen
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Plus underground equipment just released.

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1—2024 Dixie RB Hammermill, factory built 4 st. wheel truck, folding elevator, recond.
9x16" RB Jaw crusher V-belt 4 cyl. gas engine on factory built 4 st. wheel truck, recond.
5—2 yd. Brooks loaders, 4 buckets each.
160' IR 2 stage, HR tires recond.

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GOOD VALUES---ALWAYS

30 ton Plymouth Diesel Locomotive. Std. Ga.
1 & 1¼ yd. Osgood & P&H Cranes, Shovels, Draglines.
1500 ft. 150 lb. Synchronous M.D. Air Compressor.
Caterpillar "65" diesel tractor 70.25 HP and Bulldozer.
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24 x 18" American Hammermill, with Gas Engine.

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20—Tons Forged Steel Balls, 2" to 4"

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2—Blake Jaw Crushers, 10" x 20", 9" x 15"

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NEW — 105 C.F.M.
SCHRAMM COMPRESSOR
skid mounted with Buda motor
E. COHN & SONS
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14 ft., 8 ft. and 12 ft. Separators

ROLL CRUSHERS
36x60 Fairmont Single Roll.
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10x8, 13x7½, 14x7, 15x9, 15x10, 16x9, 16x12, 16x10, 18x11, 20x8, 20x6, 20x10, 20x12, 20x11, 26x12, 30x15, 30x13, 36x30, 36x18, 36x14, 36x15, 36x9, 36x6, 38x18, 36x10, 36x24, 42x9, 48x36, 60x42, 84x66, 36x16, 9x36.
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18 in., 24 in., 30 in., 36 in. and 48 in. Symons Disc.
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60 HP Fairbanks Morse.
140 HP Fairbanks Morse.
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30 K.W. Buda 110 v.

RAYMOND MILL
5 Roll High Side.

CONVEYOR PARTS
BELT: 1000 Ft. 60 In., 700 Ft. 42 In., 600 Ft. 36 In., 800 Ft. 30 In., 1642 Ft. 24 In., 517 Ft. 20 In., 297 Ft. 18 In., 1000 Ft. 14 In. & 16 In.
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Head & Tail—Pulleys—Takeup for all sizes.
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ROTARY DRYERS AND KILNS
36 In. x 20 Ft., 3 Ft. x 30 Ft., 4 Ft. x 30 Ft., 54 In. x 30 Ft., 42 In. x 24 Ft., 5 Ft. x 30 Ft., 5 Ft. x 16 Ft., 5 Ft. x 60 Ft., 6 Ft. x 60 Ft., 6 Ft. x 70 Ft., 70 In. x 40 Ft., 5x30 & 8x84 Double Shell Dryers, 8x110, 7½x100, 8x125 & 10x20 Kilns.

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STIFF LEG: 5 Ton 70 Ft. Boom, 15 Ton 100 Ft. Boom, 25 Ton 100 Ft. Boom, 75 Ton 135 Ft. Boom.

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DIESEL: 7—4½, 8 and 15 Ton 36 & 42 In. Ga.
GASOLINE: 3 Ton, 5 Ton, 8 Ton, 12, 14 & 30 Ton.
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VIBRATING: 2x4, 3x6, 2x8, 3x8, 3x5, 4x5, 4x8, 4x10, 48x72. HUMMER, ROTEX, NIAGARA & ROBINS, LINK BELT & HURON.
REVOLVING: 3x12, 3x16, 3½x18, 3x24, 4x16, 4x20, 4x23, 4x24, 5x30, 5x20, 6x20.

STEEL STORAGE TANKS
35—4000, 5000, 6000, 8000, 10000, 15000 and 20000 gal. cap. Horizontal and Vertical.
50000 gal. on 100 ft. tower.
60000 gal. on 85 ft. tower.
100000 gal. on 100 ft. tower.

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12—50 Ton Cap. Battleship Gondolas.
7—50 Ton Cap. Flat Cars.

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1—¾ yd. Gas 1—1½ yd. Electric
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R. R. TRACK SCALE
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Farrel 36 x 48.
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Universal 15 x 36.
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1—Vulcan, single drum, 98" dia., 80" face, double reduction herringbone gears, 18" face; enclosed between three sets of bearings, complete with type D Lilly governor and all modern safety features. Will furnish with either 500 H.P. or 750 H.P. motor, 3 phase, 60 cycle, 2200 volt. Hoist now operating. Built 1940, used less than two years. Offered and guaranteed the same as new. Immediate delivery.

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Gard-Denver Compressor, 630' A.A., E. Dr.
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Shovel Attach. for Byers Bearcat Jr.
Gard-Denver Loader, Model GD-9.

J. T. Walsh
Brisbane Bldg., Buffalo 3, N. Y.

Gyratory Crushers: 27", 21", 18", 12", 10"
Bucyrus-Erie gas-air shovels, 1¼-yd., A-1, (2)
Locomotives, 8 to 45 tons, 24", 30" & std. gauge, Diesel, gasoline & steam, (11)
Pioneer 300W portable gravel washing plant
P&H ¾-yd. gas shovel, Model 204, 19' boom
Newhouse 7' gyratory reduction crushers (2)
Worthington 5'x40' rotary dryer, direct
Bucyrus 50B and 80B steam shovels, 2-yd.

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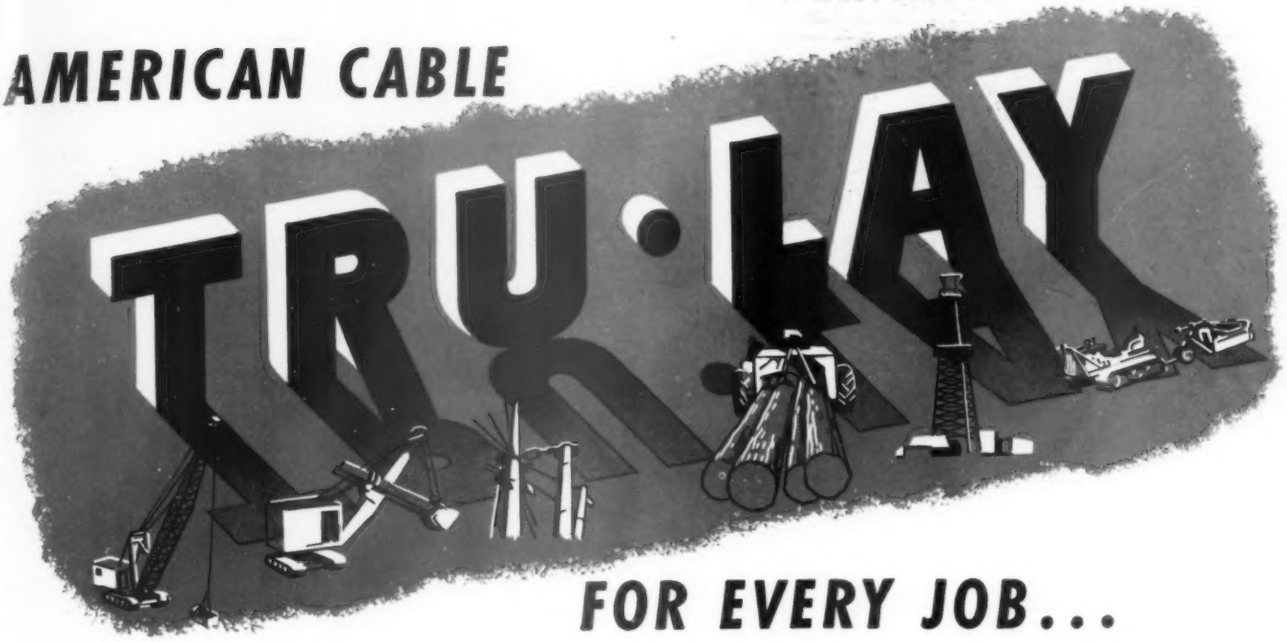

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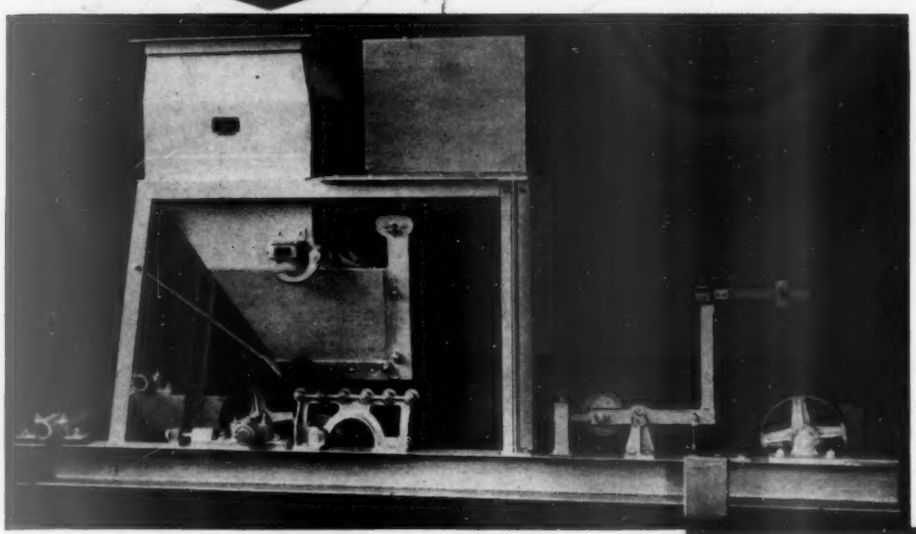

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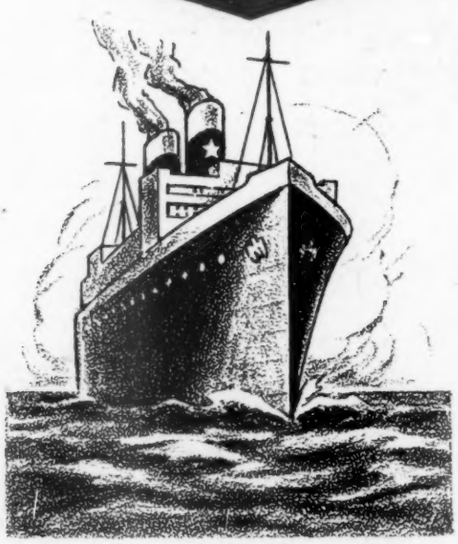

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